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Use of Selected Clinical Preventive Services Among Adults — United States, 2007–2010

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CONTENTS

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Foreword

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CDC has a long history of monitoring the use of clinical preventive services to provide public health agencies, health care providers and their partners information needed to plan and implement programs that increase use of these services and improve the health of the U.S. population. Better use of clinical preventive services could prevent tens of thousands of deaths each year. With passage of the Patient Protection and Affordable Care Act of 2010 as amended by the Heathcare and Education Reconciliation Act of 2010, which expands health insurance coverage for the United States population and increases access to preventive services, there are new opportunities to promote and improve use of these valuable and life-saving services. This report provides baseline data prior to implementation of the provisions of the Affordable Care Act.

Public health and clinical medicine complement and enrich each other, but they must engage with each other to maximize their impact. Synergies created through cooperation can amplify the impact that either might produce working alone. Public health can also serve as an honest broker by providing unbiased and scientifically accurate information to policy makers, the health-care community, and the public, and is well equipped to monitor health systems to facilitate increases in effectiveness and efficiency.

This *MMWR* Supplement on the *Use of Selected Clinical Preventive Services Among Adults — United States, 2007–2010* is the first in a periodic series of reports examining use of selected clinical preventive services. There are other important preventive health services, such as screening and brief intervention for problem alcohol use and screening and effective treatment of depression, but robust national data for these services are not currently available. For other important health problems, there are no proven, recommended clinical preventive services at present. The report focuses on the following adult services:

- Use of aspirin or antiplatelet therapy to prevent recurrent cardiovascular disease events among adults with a history of ischemic vascular disease and use of aspirin in the general population among those at increased risk for cardiovascular disease,
- control of blood pressure among adults with hypertension,
- screening for lipid disorders,
- control of blood glucose among adults who have had diabetes diagnosed,
- screening for tobacco use in office-based ambulatory-care settings and tobacco cessation counseling and medication use among current tobacco users,
- screening using mammography for breast cancer among women,
- screening for colorectal cancer in the adult population,
- assuring awareness of human immunodeficiency virus-status among those who are infected, and
- vaccination against influenza in adults.

The findings of this report indicate that tens of millions of people in the United States have not been benefitting from key preventive clinical services, and that there are large disparities by demographics, geography, and health care coverage and access in the provision of these services.

- Slightly less than half of patients with diagnosed ischemic cardiovascular disease were prescribed aspirin or other antiplatelet agents.
- Despite improvements in hypertension treatment and control over the past10 years, slightly less than half of persons in the United States with high blood pressure had it under control, and levels of control were particularly low for people who are uninsured or do not have a usual source of heath care.
- Only two thirds of adults (68%) had their cholesterol levels checked during the preceding 5 years, and among persons with high LDL cholesterol levels, less than one third (31.6%) had it under control. More than one third (36%) of people in the United States had elevated levels of low-density lipoprotein cholesterol.
- More than one third (37.3%) of outpatient visits had no documentation of tobacco use status; just one in five (20.9%) who screened positive for tobacco use received tobacco cessation counseling, and less than one in 13 (7.6%) tobacco users were prescribed cessation medications. Rates of counseling were particularly low among younger smokers, despite a high level of interest in quitting in this population; younger smokers have been shown to be more likely to try to quit but less likely to succeed, hence could benefit particularly from improved counseling and treatment

- Approximately 2.3 million adults (12.9%) with diagnosed diabetes had poor glycemic control (A1c > 9.0).
- Approximately one in five women age 50–74 years had not had a mammogram during the preceding 2 years.
- Although there have been large increases in recent years, still approximately one third of adults aged 50–75 years were not up-to-date with screening for colorectal cancer, which is the second leading cause of cancer death in the United States, the leading cause of cancer death among nonsmokers, and which can be prevented through screening and follow-up.
- Approximately one in five of the 1.1 million persons in the United States living with HIV had not been diagnosed.
- Only approximately one in four (28%) of adults aged <65 years were vaccinated against influenza; 133 million adults were not vaccinated, and vaccination rates were particularly low among the poor and those without health insurance or a medical home.

Improved clinical management of the ABCS — aspirin, blood pressure control, cholesterol management, and smoking cessation — can significantly reduce the risk for cardiovascular disease, our nation's leading killer, and could save approximately 100,000 lives each year. The Million Hearts initiative, which targets improvements in both clinical preventive practice (e.g., ABCS) and community prevention (e.g., reducing smoking and exposure to secondhand smoke and decreasing sodium and artificial trans-fat intake) by engaging public and private sectors, can prevent a million heart attacks and strokes over the next 5 years. This can reduce the number of people who need treatment and the costs of health care to our society.

This report documents the potential benefits of selected clinical preventive services, the problem of their underuse, and effective collaborative strategies to improve use. I hope the report will help increase use of these services and thereby help people in the United States live longer, healthier, and more productive lives.

Rationale for Periodic Reporting on the Use of Selected Adult Clinical Preventive Services — United States

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Summary

This supplement introduces a CDC initiative to monitor and report periodically on the use of a set of selected clinical preventive services in the U.S. adult population in the context of recent national initiatives to improve access to and use of such services. Increasing the use of these services has the potential to lead to substantial reductions in the burden of illness, death, and disability and to lower treatment costs. The majority of clinical preventive services are provided by the health-care sector, and public health agencies play important roles in helping to support increases in the use of these services (e.g., by identifying and implementing policies that are effective in increasing use of the services and by collaborating with stakeholders to conduct programs to improve use). Recent health reform initiatives, including efforts to increase the accessibility and affordability of preventive services, fund community prevention programs, and improve the use of health information technologies, offer opportunities to enhance use of preventive services. This supplement provides baseline information on a set of selected clinical preventive services before implementation of these recent reforms and discusses opportunities to increase the use of such services. This information can help public health practitioners collaborate with other stakeholders that have key roles to play in improving public health (e.g., employers, health plans, health professionals, and voluntary associations), understand the potential benefits of the recommended services, address the problem of underuse, and identify opportunities to apply effective strategies to improve use and foster accountability among stakeholders.

Clinical Preventive Services

Optimal provision of clinical preventive services has the potential to enable U.S. adults to live longer, healthier lives by reducing the burden of illness, death, and disability (*1–5*). These services include clinical interventions to reduce the risk for an adverse health condition, screening to identify and treat a condition early to reduce severity and duration, and clinical interventions to reduce complications from a condition or recurrence of a condition (*6*). Expert panels use multiple methods and procedures to review and evaluate the evidence on the benefits and harms from use of specific clinical preventive services and to develop recommendations (*5,7,8*). The U.S. Preventive Services Task Force (*9*), the Advisory Committee on Immunization Practices (ACIP) (*10*), National Institutes of Health consensus panels (*11*), and other committees (*5*) supported by federal agencies make recommendations for clinical preventive services. In addition, associations of health professionals (e.g., the American College of Physicians) and volunteer associations (e.g., the American Diabetes Association) also organize and support panels to issue guidelines (*5,12,13*).

Approximately half of the U.S. adult population does not use commonly recommended preventive services (*1–4,14,15*). The *Healthy People 2020* initiative, which identifies national objectives for improving population health, reports low levels of use of multiple clinical preventive services recognized as having national importance (*16*). For example, in 2007, only 8% of ambulatory care physician office visits included counseling or education related to exercise. In 2008, less than half of primary care physicians regularly assessed the body mass index of their adult patients. During 2005–2008, of adults aged ≥18 years with hypertension, 30% were not taking prescribed blood pressure medications.

The health-related costs of underuse of recommended clinical preventive services are substantial. Researchers have reported that increasing use of nine clinical preventive services

to more optimal levels (i.e., levels achieved by high-performing health plans) could prevent an estimated 50,000–100,000 deaths each year among adults aged <80 years (*4*). Another study found that adopting 20 preventive services recommended by the U.S. Preventive Services Task Force could prevent an estimated annual loss in life expectancy for the U.S. population as a whole of approximately 2 million years (*3*).

Role of Public Health in Clinical Preventive Services

With their focus on population health, public health agencies have played and will continue to play important roles in increasing use of recommended clinical preventive services (*17–22*). Two long-standing roles for public health are developing policies and plans to improve individual and community health and ensuring provision of health care when it is not otherwise available (*17–19*). For example, CDC-supported panels make policy recommendations for a range of clinical preventive services including vaccinations of adults and children; counseling, screening, and prevention of human immunodeficiency virus (HIV) and sexually transmitted diseases; and prevention and control of health-care–associated infections (*23–25*). In addition, public health agencies improve access to clinical preventive services to the broader population by providing services directly, funding the delivery of services through nonprofit community public health clinics, community organizations, or private practices and by providing selected services in nonclinic settings (*26–28*).

Another important role of public health is identifying community preventive services (i.e., policies, laws, programs and initiatives, education programs, and health system interventions) that are effective in increasing use of clinical preventive services (*19,22*). To support this function, in 1996, the U.S. Department of Health and Human Services initiated the Community Preventive Services Task Force to examine the effectiveness of a range of community preventive services. The Community Preventive Services Task Force conducts systematic literature reviews to evaluate evidence and uses explicit criteria and procedures to make recommendations (*22*). Among the community preventive services reviewed and recommended by the Community Preventive Services Task Force are policy and health system interventions that facilitate the delivery of clinical preventive services. These interventions act by reducing patients' out-of-pocket costs (e.g., policies that require no or reduced copayment for clinical preventive services), reducing barriers to access (e.g., through changes in clinic hours or providing services through mobile vans), and using patient tracking systems to identify eligible patients and provide decision support (e.g., patient and provider reminders about the need for and timing of clinical services). In addition, the Community Preventive Services Task Force recommends ongoing surveillance to monitor, evaluate, and report on performance in the use of clinical preventive services, which is an effective and important means of increasing service delivery by clinicians and health plans (*22*). The Community Preventive Services Task Force also reviews and makes recommendations about policy changes, public health education programs, employee wellness programs, and changes in the physical and social environment to promote use of clinical preventive services and healthy behaviors (e.g., tobacco avoidance, physical activity, weight control, and seatbelt use). Community interventions to promote healthy behaviors have the potential to reduce the need for certain clinical preventive services (e.g., by reducing the prevalence of tobacco use and obesity), thereby decreasing the need for counseling and other clinical interventions.

Public health also plays a critical role in collaborating with other stakeholders to implement effective community interventions to increase use of clinical preventive services. Population health is the outcome not only of services provided by the health-care system and public health agencies but also by the activities of private and voluntary organizations and persons, including employers, health plans, and other stakeholders (*17–20*). Each stakeholder can implement interventions to increase use of clinical preventive services. CDC has played a leading role in collaborating with stakeholders at the national level and in supporting state and local public health agencies to develop community coalitions to engage in prevention and control programs, including, but not limited to, increasing implementation of interventions recommended by the Community Preventive Services Task Force (*24,29,30,31*).

Finally, to help other stakeholders plan effective collaborations, public health has a role in monitoring, evaluating, and reporting on how well communities and stakeholders are doing in increasing use of recommended community interventions as well as use of clinical preventive services (*20,32*). An example of such surveillance is CDC's State Tobacco Activities Tracking and Evaluation (STATE) System, which tracks state tobacco-control policies (*33*). Monitoring the number and percentage of employers whose employee health insurance policies provide coverage for clinical preventive services recommended by the National Business Group on Health (*29*) is another example of the type of surveillance that could be conducted. To promote accountability among stakeholders responsible for population health, public health authorities will need to develop additional performance-measurement systems that track specific, effective actions by stakeholders (e.g., worksite wellness programs

and use of patient tracking and reminder systems for clinical preventive services) as well as health outcomes (e.g., lower disease rates) (*20,32*).

Opportunities Offered by Recent Changes to the U.S. Health-Care System

Recent changes in the U.S. health-care system provide opportunities to expand use of preventive services. The Patient Protection and Affordable Care Act of 2010 as amended by the Healthcare and Education Reconciliation Act of 2010 (referred to collectively as the Affordable Care Act [ACA]) emphasizes both population-based prevention and individual clinical preventive services (*34–38*). Implementation of the Affordable Care Act has the potential to lead to substantial reductions in morbidity, premature mortality, and associated health spending by expanding access to health insurance and increasing use of preventive services (*34–38*). In 2009, an estimated 58.5 million persons in the United States lacked health insurance for at least some part of the previous 12 months; among adults aged 18–64 years, 25.6% were uninsured for at least part of the year (*39*). The Congressional Budget Office has estimated that implementation of the Affordable Care Act will extend insurance coverage to 93% of the nonelderly U.S. population by 2016 (*38*). Medicare now covers adult clinical preventive services graded A (strongly recommended) or B (recommended) by the U.S. Preventive Services Task Force and immunizations recommended by ACIP. These services, together with recommended preventive services for children, youth, and women, will be covered at no cost sharing by newly qualified private health plans in the state-based insurance exchanges that are to start operating in 2014, when a competitive insurance marketplace will be set up in the form of state-based insurance exchanges (ACA §1311). These exchanges will allow eligible persons and small businesses with up to 100 employees to purchase health insurance plans that meet criteria outlined in the Affordable Care Act (*34,37*). If a state does not create an exchange, the federal government will operate it. Beginning in 2013, state Medicaid programs that eliminate cost sharing for these clinical preventive services might receive enhanced federal matching funds for them (*34,35*). In addition, Medicare covers an annual wellness visit (which includes a health-risk assessment and a personalized prevention plan) at no cost to beneficiaries. In December 2011, as required by the Affordable Care Act, CDC issued evidence-based guidelines for individualized health-risk assessment (*40*). Improved insurance coverage, expanded benefits, reduced cost-sharing and improved access to health services can increase use of clinical preventive services (*22,29,35*). The uninsured are identified frequently as one of the population subgroups with the lowest use of clinical preventive services (*41*). Even for those who are insured, cost is often a barrier to service use (*42*). The Affordable Care Act addresses cost impediments to care through additional provisions, including eliminating lifetime and annual limits on private insurance coverage and providing premium rebates if insurers' administrative costs are too high, offering discounted prescription drugs for seniors; providing tax credits for insurance coverage for those from 100%–400% of the federal poverty limit and for small businesses, and extending coverage for young adults up to age 26 years through continued coverage under their parents' insurance plans.

The Affordable Care Act reauthorized the U.S. Preventive Services Task Force (and for the first time authorized the Community Preventive Services Task Force) to continue updating and conducting new reviews, identify research gaps, and make recommendations for evidence-based prevention programs. In addition, the Affordable Care Act created and provided funding for the Prevention and Public Health Fund, which enables communities to prevent the leading causes of death, strengthens state and local disease detection and response, and produces information for action (*34–36*). In Fiscal Year 2011, CDC was allocated $611 million from the Prevention and Public Health Fund to strengthen prevention, improve the health of the U.S. population, and bolster the ability to detect and respond to both natural and deliberate disease threats. The Affordable Care Act substantially expanded funding for federally qualified community health centers through the Health Resources and Services Administration (HRSA), committing $11 billion over 5 years. It also authorized demonstrations of new payment and care delivery models (e.g., accountable care organizations and community health teams) to promote a population health approach to clinical care (*43*). Together, these provisions will work to integrate primary care services into community-based mental and behavioral health settings and will support the expansion of the primary care workforce, which can increase access to preventive services (*34–36*).

Recognizing the importance of broad collaboration for prevention, Congress included the National Prevention Strategy in the Affordable Care Act. Created by the National Prevention, Health Promotion, and Public Health Council in consultation with the public and an advisory group of outside experts, the comprehensive plan, which was released on June 16, 2011, includes specific actions public and private partners can take to help Americans stay healthy (*44*). The National Prevention Strategy encourages partnerships among federal, state, tribal, local, and territorial governments; business,

industry, and other private sector partners; philanthropic organizations; community and faith-based organizations; and individuals to improve health through prevention. It is a cross-sector, integrated national strategy that identifies priorities for improving the health of the U.S. population. Through these partnerships, the National Prevention Strategy aims to improve public health by helping to create healthy and safe communities, expand clinical and community-based preventive services, empower people to make healthy choices, and eliminate health disparities (*44*).

Other national initiatives that have been implemented in recent years are also likely to increase use of preventive services. The American Recovery and Reinvestment Act (ARRA) of 2009 invested in the expansion of community health centers (*45*). The portion of ARRA known as the Health Information Technology for Economic and Clinical Health (HITECH) Act, as well as amendments to the Public Health Service Act, support increased use of health information technology as a means of improving the quality, efficiency, and safety of health care (*46,47*). A draft national strategic plan for health information technology published in 2011 for public comment outlines multiple strategies that have the potential to increase use of preventive services in health care through the use of electronic information technologies (*47*). The Centers for Medicare and Medicaid Services is offering incentives to providers to increase their use of electronic health information systems and has included selected clinical preventive services as potential quality of care measures (*48*). Electronic health information systems increase the ability of clinicians and health plans to identify all patients in need of preventive services more easily and systematically, deliver reminders to patients and providers, and assist them in making informed decisions. They also could contribute to evaluating and reporting on the timeliness and quality of care. In addition, by facilitating information exchange, such systems could support patient self-management and improve coordination of care among primary care professionals and specialists. Finally, the new health information technologies together with the other health reform initiatives create opportunities for greater sharing of information and closer collaboration between public health and clinical care professionals to improve the health of the U.S. population.

About This Surveillance Supplement

This surveillance supplement is the first of a series of periodic reports from CDC to monitor and report on progress made at the population level in increasing the use of a set of clinical preventive services identified by CDC as public health priorities. The audience for the report is the broad range of stakeholders who shape the health of the U.S. population, including public health practitioners, employers, health plans, health professionals, and voluntary associations. Before selecting a limited set of clinical preventive services to include in this report, CDC considered a wide range of services and surrogate measures of service use (e.g., proximal biologic outcome measures) to indicate whether a disease is under control. For example, CDC considered a set of adult clinical preventive services that were identified by the Affordable Care Act and that have been evaluated and recommended by the U.S. Preventive Services Task Force or by ACIP (*34*). Also reviewed were clinical preventive services for areas of public health identified by CDC as priorities, including aspirin therapy, blood pressure and cholesterol control, and smoking cessation (the ABCS for heart disease and stroke prevention) (*49*) as well as those related to food safety, immunizations, health-care–associated infections, HIV, motor-vehicle injuries, obesity, teen pregnancy, and tobacco use (*50*).

To select indicators important to the public, stakeholders, and policy makers, CDC identified a set of clinical preventive services that 1) address leading causes of illness, injury, disability, or death; 2) are underutilized but have the potential for substantial increases in use over the next few years with focused effort; 3) have substantial effects on population health, as measured by deaths prevented or healthy life years gained (*2–4*); 4) are priorities of CDC public health programs and the coalitions of stakeholders; and 5) have routinely collected nationally representative surveillance data available for measurement. Consideration also was given as to whether the same or similar indicators were used by other national efforts to monitor and promote progress in use of clinical preventive services, including *Healthy People 2020*, the National Quality Forum, and the National Committee for Quality Assurance (*16,51,52*).

Using these criteria, CDC leadership initiated an iterative process to develop the final list of indicators. A work group that included leaders from multiple CDC programs was formed to develop a proposal; the proposal was then reviewed in more detail by personnel from a broader set of CDC programs and by an external expert work group convened by a member of the Advisory Committee of the Director of CDC.* The work group included leaders in academia, public health, other government agencies, and the private sector. A revised proposal was developed and approved by CDC leadership.

*A list of the members of the two work groups appears on page 78.

Clinical Preventive Services Indicators

The indicators used in this surveillance supplement address leading causes of death and disability in the United States among adults: heart disease, stroke, cancer, diabetes, influenza, and HIV (*13,23,53–65*) (Table). Also addressed is tobacco use, which is a major contributor to many of those diseases (*53–55,62*). Most of the indicators are for services recommended by the U.S. Preventive Services Task Force or ACIP, but include others as well. The indicators measure use or biologic effects of preventive services that are underutilized and that, if increased over the next few years, could improve the health of the U.S. population substantially. Improvement in the use of those services is also a focus of public health and community programs as well as national health-care quality improvement efforts.

Given the large number of clinical preventive services recommended for adults, children, or adolescents combined, and recognizing that the set of stakeholders and surveillance systems for adult services differ somewhat from those for adolescent and children's services, CDC decided to limit the scope of this supplement to adult services. A separate supplement covering indicators for clinical preventive services in children is being planned.

For multiple reasons, certain potentially important adult services were not included. For example, the U.S. Preventive Services Task Force does not address food safety specifically and has determined that evidence is insufficient to recommend counseling and other clinical interventions to prevent motor-vehicle injuries, increase physical activity, or counsel most patients to promote a healthy diet, although intensive dietary counseling is recommended for obese adults and those with high cholesterol or cardiovascular disease (*9*). Obesity screening and alcohol screening are recommended (*9*), but surveillance data were not available for adequate indicators. Screening for depression also is excluded because current surveillance systems do not have information on the ability of clinician practices to provide effective supportive care for depression. The U.S. Preventive Services Task Force recommends depression screening only when staff-assisted depression care supports are available to assure accurate diagnosis, effective treatment, and follow-up (*9*). The U.S. Preventive Services Task Force recommends against screening when such supportive care is not available because the benefit of screening depends on the availability of beneficial interventions (*9*).

Use of This Report

In its 2011 report on the role of measurement in action and accountability in public health (*20*), the IOM outlined several uses for the kind of information provided in this supplement. The reports in this supplement provide the public and stakeholders responsible for population health (including public health agencies, employers, health plans, health professionals, community groups, and voluntary associations) with easily understood and transparent information about the use of clinical preventive services that can improve population health. Stakeholders can use this information to increase use of these services and to stimulate action, promote responsibility, and hold each other accountable for implementing effective strategies to increase use. In addition, publication of this information on a diverse set of selected adult services in a single supplement offers the opportunity for stakeholders to reduce the burden of both chronic and infectious diseases simultaneously by coordinating efforts when appropriate to increase use of all of these preventive services for all U.S. adults.

TABLE. Selected adult clinical preventive services and the clinical practice recommendation or guideline for the preventive service, by topic, indicator of service use, and issuing organization — United States, 2012

Topic/Indicator	Organization
Aspirin and other antiplatelet therapy	
Percentage of adults aged ≥18 years with a history of history of ischemic vascular disease who are prescribed aspirin or other antiplatelet medications to prevent recurrent CVD	ACCP/ACC/AHA*
Percentage of men aged 45–79 years and women aged 55–79 years without ischemic vascular disease who are prescribed aspirin when the potential benefit of a reduction in myocardial infarction or stroke, respectively, outweighs the potential harm attributable to an increase in gastrointestinal hemorrhage	USPSTF†
Hypertension management	
Percentage of adults aged ≥18 years with hypertension whose blood pressure is under control	JNC7§
Lipid management	
Percentage of men aged ≥35 years who have been screened for lipid disorders	USPSTF¶
Percentage of men aged 20–34 years at increased risk for coronary heart disease who have been screened for lipid disorders	USPSTF¶
Percentage of women aged ≥45 years at increased risk for coronary heart disease who have been screened for lipid disorders	USPSTF¶
Percentage of women aged 20–44 years at increased risk for coronary heart disease who have been screened for lipid disorders	USPSTF¶
Percentage of adults aged ≥20 years with abnormal lipids at increased risk for coronary heart disease who had high LDL cholesterol, were taking lipid-lowering medication, and whose high LDL cholesterol was under control	NCEP**
Diabetes management	
Percentage of adults aged ≥18 years with diagnosed diabetes whose glycohemoglobin (A1c) is ≤9%	NDQIA††
Tobacco cessation	
Percentage of office-based ambulatory care setting visits with screening for tobacco use among adults aged ≥18 years	USPSTF§§
Percentage of office-based ambulatory care setting visits with tobacco cessation counseling among current tobacco users in adults aged ≥18 years	USPSTF§§
Percentage of office-based ambulatory care setting visits with tobacco cessation medications among current tobacco users in adults aged ≥18 years	USPSTF§§
Percentage of recent smoking cessation success by adult smokers aged ≥18 years, who ever smoked 100 cigarettes, who do not smoke now, and last smoked 6 months to 1 year ago	USPSTF§§
Breast cancer screening	
Percentage of women aged ≥40 years who had a mammogram within the previous 2 years	USPSTF¶¶,***
Percentage of women aged 50-74 years who had a mammogram within the previous 2 years	USPSTF¶¶,***
Colorectal cancer screening	
Percentage of adults aged 50–75 years who have had a fecal occult blood test (FOBT) within the past year, or sigmoidoscopy within the past 5 years and FOBT within the past 3 years, or colonoscopy within the past 10 years	USPSTF†††
HIV screening	
Percentage of persons aged ≥13 years living with HIV who know they are infected	USPSTF¶¶¶/CDC¶¶¶
Influenza vaccination	
Percentage of adults aged 18–64 years vaccinated annually against seasonal influenza	ACIP****

Abbreviations: ACC = American College of Cardiology; ACCP = American College of Chest Physicians; ACIP = Advisory Committee on Immunization Practices; ADA = American Diabetes Association; AHA = American Heart Association; CHD = coronary heart disease; CVD = cardiovascular disease; HDL-C = high-density lipoprotein cholesterol; HIV = Human Immunodeficiency Virus; JNC7 = Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure; LDL-C = low-density lipoprotein cholesterol; NCEP = National Cholesterol Education Program; NDQIA = National Diabetes Quality Improvement Alliance; TC = total cholesterol; USPSTF = U.S. Preventive Services Task Force.

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Recommended Use of Aspirin and Other Antiplatelet Medications Among Adults — National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey, United States, 2005–2008

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Introduction

Cardiovascular disease (CVD) is the most highly prevalent disease in the United States and remains the leading cause of death among adults aged ≥18 years despite advancements in treatment and prevention in recent decades (*1*). Each year, approximately 800,000 persons die from CVD, which includes coronary heart disease (CHD) (*1,2*); the majority of those persons who die from CVD had underlying atherosclerosis. Approximately 7.9 million U.S. adults have a history of heart attack, approximately 7 million U.S. adults have a history of stroke (*1*), and, approximately 16 million U.S. adults have received a diagnosis of CHD (*2*). CVD and CHD cause a substantial economic burden in the United States. In 2010, the estimated annual cost (direct and indirect) of CVD in the United States was approximately $450 billion, including $109 billion for CHD and $54 billion for stroke alone (*3*).

Preventive care and lifestyle interventions have proven to be effective in reducing atherosclerotic CVD (*4,5*). Taking aspirin or other antiplatelet medications is one of several preventive interventions that can provide substantial benefit for patients with ischemic vascular disease and is strongly recommended in practice guidelines (*6,7*). This report summarizes the estimated prevalence of physician prescription of aspirin and other antiplatelet medications for patients with or without ischemic vascular disease as recommended by the U.S. Preventive Services Task Force (USPSTF) and other major guidelines (*8–15*). Previous research has indicated that the use of aspirin among eligible patients is suboptimal, even for those patients at highest risk (*16*). In persons who do not have a history of ischemic vascular disease, the net benefit is dependent upon the patient's risk for suffering a stroke or myocardial infarction compared with their chances of harm from treatment.

The information in this report is intended for clinicians who treat patients with ischemic vascular disease and patients who are at high risk for suffering cardiovascular disease and stroke. In addition, this information can serve as a baseline to monitor progress and measure the impact of use of recommended clinical preventive services.

Methods

To estimate the prevalence of physician-prescribed aspirin and other antiplatelet medications (e.g., clopidogrel, ticlid, and dipyridamole) among adults aged ≥18 years with or without ischemic vascular disease as recommended by USPSTF and other major guidelines, CDC analyzed 2005–2008 data from the National Ambulatory Medical Care Survey (NAMCS) and the National Hospital Ambulatory Medical Care Survey (NHAMCS) (*17*). These two national surveys collect data annually on the provision of ambulatory care services to patients of all ages from office-based physicians and in-hospital outpatient departments. The methods and sampling frame of NAMCS and NHAMCS have been described in detail elsewhere (*18*). Pregnant women (ICD-9-CM codes: V22, V23, and V28), visits for pre- or postsurgery follow-up, patients with documented contraindications to chronic aspirin use (coagulation defects, purpura and other hemorrhagic conditions, subarachnoid hemorrhage, intracerebral hemorrhage, acute hepatic failure, and gastrointestinal hemorrhage), and persons prescribed anticoagulant medication (warfarin, heparin, or low molecular weight heparins) were excluded from this analysis of patients with or without ischemic vascular disease. In addition, patients without ischemic vascular disease who were prescribed nonsteroidal anti-inflammatory drugs (NSAIDs) were excluded from analyses because of the increased risk for bleeding complications when NSAIDs are used together with aspirin.

For both study groups (patients with and those without ischemic vascular disease), the unit of analysis used was a patient visit. With the exception of physician and clinic specialty (obtained from the provider interview and sampling frames), all data in this analysis were obtained through abstraction of patient visit records using a standardized patient record form. Key items included on the patient record form include major reason for visit (new problem [<3 months], chronic problem [routine or flare-up], and preventive care); a maximum of three ICD-9-CM diagnosis codes related to the visit); systolic blood pressure; regardless of visit diagnoses, separate checkboxes identifying patients with diagnoses of cerebrovascular disease, congestive heart failure, diabetes, hypertension, hyperlipidemia, and ischemic heart disease; check boxes to identify patient's tobacco use ("current," "not current," or "unknown"); and up to eight over-the-counter or prescription drugs that were "ordered, supplied, administered, or continued at this visit." Aspirin and other antiplatelet medications identified as either "new" or "continued at this visit" were considered as prescribed in this analysis.

Of a total of 198,042 patient visits among adults aged ≥18 years, 6,574 (4.0%) visits met the criteria for visits by patients having ischemic vascular disease. For patients with ischemic vascular disease, analysis was limited to visits to physicians in the following specialties: general medicine, family practice, general practice, general medicine, geriatric medicine, internal medicine, cardiovascular diseases, and neurology as well as to hospital outpatient department clinics specializing in general medicine or obstetrics and gynecology. Ischemic vascular disease was determined by the presence of an International Classification of Disease, Ninth Revision, Clinical Modification (ICD-9-CM) code for ischemic heart disease, ischemic stroke or carotid stenosis, peripheral vascular disease, or atheroembolic disease (ICD-9-CM codes: 410, 411, 412, 413, 414.0, 414.2, 414.8, 414.9, 429.2, 433, 434, 435, V12.54, 437.0, 437.1, 440.1, 440.2, 444, 445, V45.81, and V45.82) or by the presence of a current diagnosis of cerebrovascular disease or ischemic heart disease.

Of 198,042 patient visits among adults aged ≥18 years, 9,369 (6.1%) visits met the criteria for visits by patients without ischemic vascular disease. For patients without ischemic vascular disease, the analysis was limited to practitioners in general medicine, family practice, general practice, geriatric medicine, cardiovascular diseases, and internal medicine. The inclusion criteria for patients without ischemic vascular disease were defined so as to include men aged 45–79 years at risk for myocardial infarction and women aged 55–79 years at risk for stroke. The inclusion criteria were based on clinical guidelines (*10,12–15*) and USPSTF recommendations identifying the risk levels at which benefit of treatment outweighs the harm of treatment (e.g., gastrointestinal or cerebral hemorrhage) (*8*).

Sex-specific risk levels for myocardial infarction and stroke were based on Framingham risk for coronary heart disease risk for men and Framingham stroke risk for women (*19*). Visits by men aged 45–59 years with at least an intermediate risk (≥ 6% for a 10-year risk) for coronary heart disease were defined as one or more risk factors (hypertension, current tobacco user, hypercholesterolemia, or diabetes). Visits by men aged 60–79 years with a high risk (≥10% for a 10-year risk) for coronary heart disease were defined as having two or more risk factors (hypertension, current tobacco user, hypercholesterolemia, or diabetes). Visits by women aged 55–64 years with a moderate risk for stroke (i.e., ≥6% for a 10-year risk) were defined as having 1) atrial fibrillation, 2) left ventricular hypertrophy plus either hypertension or diabetes or current tobacco use, or 3) hypertension, diabetes, and current tobacco use. Visits by women aged 65–79 years with a high risk for stroke (i.e., ≥10% for a 10-year risk) were defined as having atrial fibrillation or any two risk factors (left ventricular hypertrophy, hypertension, diabetes, or current tobacco use).

Data from NAMCS and NHAMCS were combined, and two time intervals were selected for analysis: 2005–2006 and 2007–2008. Patient visit weights were used to extrapolate these findings to national estimates. Chi-square or the Fisher exact test was used to test for the statistical significance of the associations, and a two-tailed p-value at the $p = 0.05$ level was deemed statistically significant. If chi-square tests were statistically significant, a post hoc t-test procedure was used to make pairwise comparisons. All data analyses were performed with SAS (Release 9.2, Cary, North Carolina). To account for survey design features, including clustering and weighting, all statistical analyses were performed with the statistical software package SUDAAN (Release 9.2, Research Triangle Institute, Research Park, North Carolina).

Results

During 2007–2008, physicians prescribed aspirin and other antiplatelet medications at 46.9% of patient visits for patients with ischemic vascular disease, with no change compared with 2005–2006 (Table 1). Aspirin and other antiplatelet medications were prescribed less often at visits by female patients compared with visits by male patients ($p = 0.002$). Of the disease subgroups examined, physicians prescribed aspirin and other antiplatelet medications significantly more often when a patient had hyperlipidemia or ischemic heart disease and significantly less often for a patient with cerebrovascular disease. Cardiologists prescribed aspirin and other antiplatelet medications at 68% of visits compared with primary care

TABLE 1. Aspirin and other antiplatelet medication prescribed at outpatient visits among patients with ischemic vascular disease — National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey, United States, 2005–2008

Characteristic	Aggregate 2005–2008 Sample no.	Aggregate 2005–2008 (%) (n = 6,574)*	Antiplatelet medication prescribed % (SE) 2005–2006 Yes (n = 1,462)		2005–2006 No (n = 1,606)		2007–2008 Yes (n = 1,732)		2007–2008 No (n = 1,774)	
Age group (yrs)										
18–44	**343**	**(5.2)**	43.9	(7.5)	56.1	(7.5)	36.3	(6.7)	63.7	(6.7)
45–54	**834**	**(12.7)**	48.2	(4.6)	51.8	(4 6)	41.5	(3.9)	58.5	(3.9)
55–64	**1,475**	**(22.4)**	47.3	(3.5)	52.7	(3.5)	48.5	(2.8)	51.5	(2.8)
65–79	**2,600**	**(39.6)**	45.9	(2.6)	54.1	(2.6)	47.4	(3.2)	52.6	(3.2)
≥79	**1,322**	**(20.1)**	44.1	(3.8)	55.9	(3.8)	48.6	(3.4)	51.4	(3.4)
Sex										
Female	**3,019**	**(45.9)**	40.8	(2.6)	59.2	(2.6)	42.3	(2.3)	57.7	(2.3)
Male	**3,555**	**(54.1)**	50.0	(2.6)	50.0	(2.6)	50.4	(2.5)	49.6	(2.5)
Race/Ethnicity										
White, non-Hispanic	**4,940**	**(75.1)**	46.4	(2.2)	53.6	(2.2)	47.8	(2.3)	52.2	(2.3)
Black, non-Hispanic	**759**	**(11.6)**	45.6	(6.1)	54.4	(6.1)	44.8	(4.0)	55.2	(4.0)
Hispanic	**560**	**(8.5)**	43.4	(4.7)	56.6	(4.7)	41.3	(4.5)	58.7	(4.5)
Other	**315**	**(4.8)**	42.2	(7.1)	57.8	(7.1)	47.1	(6.9)	52.9	(6.9)
Region†										
Northeast	**1,691**	**(25.7)**	46.8	(3.0)	53.2	(3.0)	45.9	(2.9)	54.1	(2.9)
Midwest	**1,435**	**(21.8)**	45.9	(2.6)	54.1	(2.6)	48.0	(2.8)	52.0	(2.8)
South	**2,469**	**(37.6)**	42.1	(5.3)	57.9	(5.3)	37.1	(4.8)	62.9	(4.8)
West	**979**	**(14.9)**	48.7	(8.6)	51.3	(8.6)	51.6	(5.6)	48.4	(5.6)
Source of payment (n = 6,455)										
Private	**1,764**	**(27.3)**	50.9	(4.0)	49.1	(4.0)	45.8	(4.2)	54.2	(4.2)
Medicare	**3,663**	**(56.8)**	49.0	(3.9)	51.0	(3.9)	49.5	(2.6)	50.5	(2.6)
Medicaid	**536**	**(8.3)**	42.9	(3.4)	57.1	(3.4)	46.7	(4.0)	53.3	(4.0)
Other	**492**	**(7.6)**	41.5	(5.8)	58.5	(5.8)	45.5	(5.0)	54.5	(5.0)
Systolic blood pressure (n = 5,978)										
Systolic <140	**4,094**	**(68.5)**	45.9	(2.4)	54.1	(2.4)	49.4	(2.4)	50.6	(2.4)
Systolic 140–159	**1,323**	**(22.1)**	46.6	(3.2)	53.4	(3.2)	44.3	(3.3)	55.7	(3.3)
Systolic ≥160	**561**	**(9.4)**	51.7	(4.7)	48.3	(4.7)	50.3	(6.3)	49.7	(6.3)
Major reason for visit (n = 6,468)										
Preventive care	**685**	**(10.6)**	43.0	(5.0)	57.0	(5.0)	49.0	(4.7)	51.0	(4.7)
New problem	**1,418**	**(21.9)**	39.6	(3.2)	60.4	(3.2)	38.2	(3.1)	61.8	(3.1)
Chronic	**4,365**	**(67.5)**	49.3	(2.4)	50.7	(2.4)	49.3	(2.4)	50.7	(2.4)
Enrolled in disease management program										
Enrolled/ordered/advised to enroll	**1,164**	**(17.7)**	53.8	(3.8)	46.2	(3.8)	43.2	(4.9)	56.8	(4.9)
Not enrolled	**1,902**	**(28.9)**	48.1	(3.0)	51.9	(3.0)	51.6	(4.4)	48.4	(4.4)
Unknown/Not applicable	**3,508**	**(53.4)**	40.6	(2.8)	59.4	(2.8)	46.0	(2.5)	54.0	(2.5)
Specialty										
Cardiology	**2,162**	**32.9)**	66.5	(2.9)	33.5	(2.9)	68.0	(2.9)	32.0	(2.9)
Neurology	**629**	**(9.6)**	46.8	(4.0)	53.2	(4.0)	42.4	(5.0)	57.6	(5.0)
General medicine/Primary care	**3,783**	**(57.5)**	37.9	(2.7)	62.1	(2.7)	34.8	(2.3)	65.2	(2.3)
Ischemic heart disease										
Yes	**4,933**	**(75.0)**	47.6	(2.2)	52.4	(2.2)	50.9	(2.1)	49.1	(2.1)
No	**1,641**	**(25.0)**	40.5	(3.7)	59.5	(3.7)	34.5	(3.7)	65.5	(3.7)
Cerebrovascular disease										
Yes	**1,890**	**(28.8)**	44.4	(3.7)	55.6	(3.7)	37.3	(3.3)	62.7	(3.3)
No	**4,684**	**(71.2)**	46.4	(2.2)	53.6	(2.2)	50.8	(2.3)	49.2	(2.3)
Diabetes										
Yes	**1,898**	**(28.9)**	42.1	(2.9)	57.9	(2.9)	44.4	(2.8)	55.6	(2.8)
No	**4,676**	**(71.1)**	47.4	(2.3)	52.6	(2.3)	47.8	(2.4)	52.2	(2.4)
Hypertension										
Yes	**4,201**	**(63.9)**	49.5	(2.4)	50.5	(2.4)	49.2	(2.3)	50.8	(2.3)
No	**2,373**	**(36.1)**	39.3	(2.9)	60.7	(2.9)	42.6	(3.1)	57.4	(3.1)
Hyperlipidemia										
Yes	**3,280**	**49.9)**	50.7	(2.5)	49.3	(2.5)	56.1	(2.5)	43.9	(2.5)
No	**3,294**	**(50.1)**	40.5	(2.6)	59.5	(2.6)	36.8	(2.8)	63.2	(2.8)
Congestive heart failure										
Yes	**752**	**(11.4)**	35.1	(5.1)	64.9	(5.1)	47.5	(4.8)	52.5	(4.8)
No	**5,822**	**(88.6)**	47.3	(2.2)	52.7	(2.2)	46.8	(2.1)	53.2	(2.1)
Total	**6,574**		**45.9**	**(2.1)**	**54.1**	**(2.1)**	**46.9**	**(2.1)**	**53.1**	**(2.1)**

Abbreviation: SE = standard error.

* Denominator used equals 6,574 unless otherwise specified by category.

† *Northeast*: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. *Midwest*: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. *South*: Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. *West*: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

specialists, who prescribed aspirin and other antiplatelet medications at only 35% of visits (p<0.001).

Although systolic blood pressure was measured as ≥160 mm Hg at only 9.4% of visits among those with ischemic vascular disease, physicians prescribed aspirin and other antiplatelet medications at 50% of these visits (Table 1). Aspirin use in the presence of uncontrolled hypertension increases the risk for hemorrhagic stroke (*20*). Among visits for preventive care or chronic disease care, physicians prescribed aspirin and other antiplatelet medications (both at 49%) compared with 38% for visits for a new problem (p<0.05 and p<0.01, respectively). During 2007–2008, the distribution of aspirin and other antiplatelet medications prescribed at visits among those with ischemic vascular disease (total: 1,732 sample visits when aspirin and other antiplatelet medications were prescribed), indicated that aspirin alone was prescribed at 59.3% of visits, aspirin and another antiplatelet medication was prescribed at 24.2% of visits, and an antiplatelet medication other than aspirin was prescribed at 16.6% of visits.

Physicians prescribed aspirin and other antiplatelet medications at 17.1% of visits during 2007–2008 for patients at risk for ischemic vascular disease (Table 2). If the analysis were limited to aspirin, with other antiplatelet medications excluded, the corresponding prescribing rate would be 14.9%. During 2007–2008, physicians prescribed aspirin and other antiplatelet medications at relatively few of the visits by patients in the USPSTF population recommended for consideration of aspirin for prevention of CVD and stroke (16.2% of visits by males and 21.7% of visits by females; p<0.05). Physicians prescribed antiplatelet medications at 14.1% of patient visits with a measured systolic blood pressure of ≥160 mm Hg for patients without ischemic vascular disease. Physicians were more likely to prescribe aspirin or other antiplatelet medications for patients seen for a chronic condition than they were for those seen for a new problem (19.5% versus 12.8%, respectively; p<0.01). Physicians were least likely to prescribe antiplatelet medication at visits paid by Medicaid (13.1%) whereas physicians prescribed these medications most often at visits paid by Medicare (21.9%; p<0.01).

During 2007–2008, the distribution of aspirin and other antiplatelet medications prescribed for patients without ischemic vascular disease (total: 1,030 sample visits at which aspirin and other antiplatelet medications were prescribed) indicated that aspirin alone was prescribed at 82.3% of visits, aspirin and another antiplatelet medication was prescribed at 6.7% of visits, and an antiplatelet medication other than aspirin was prescribed at 6.8% of visits (data not reported). At the visit level, among patients without ischemic vascular disease, physicians were most likely to prescribe aspirin and other antiplatelet medications for those patients with congestive heart failure (26.4%; p<0.05).

Discussion

The findings provided in this report indicate that prevalence of prescribing aspirin or other antiplatelet medications at outpatient health-care visits is low for patients who have been recommended to receive these medications based on the presence of ischemic vascular disease or certain risk factors. Despite the low prevalence of aspirin prescribing identified in this analysis, other studies using the same data sources have demonstrated that aspirin and other antiplatelet medication prescribing among patients with ischemic vascular disease was only 32.8% in 2003 (*16*). Previous reports have estimated that for every 10% increase in the use of antiplatelet medication among eligible adults aged 18–79 years, an estimated 8,000 deaths per year would be prevented (*21*). A 2006 study that ranked clinical preventive services based on cost effectiveness and the clinically preventable burden of disease demonstrated that aspirin prevention counseling was one of three prevention services that received the highest score among 25 studied preventive services (*22*).

Use of aspirin or other antiplatelet medications among patients with ischemic vascular disease is recommended by multiple guidelines addressing prevention of atherosclerotic heart disease, ischemic stroke and transient ischemic attacks, and peripheral vascular disease (*8–15*). The results of this analysis demonstrate that even among patient visits with evidence of ischemic or atherosclerotic heart, brain, and peripheral vascular disease, prescribing of aspirin and other antiplatelet medications is <50% despite many guidelines recommending treatment and multiple National Quality Forum (NQF)–endorsed measures of care supporting their use. Among patient visits by those with ischemic vascular disease, primary care providers prescribed antiplatelet medication at only 35% of visits. Cardiologists prescribed antiplatelet medications more frequently (at 68% of visits) than physicians in other specialties examined. Cardiologist prescribing practices were similar to that seen in the Reduction of Atherothrombosis for Continued Health (REACH) Registry (*23*) of 71% antithrombotic use among patients with established atherothrombosis or three or more risk factors for cardiovascular disease and stroke. Consistent with this finding, treatment by a cardiologist was associated with a higher frequency of prescribing antiplatelet therapy compared with prescribing by neurologists and primary care providers.

Differences in categorization of patients to those with or without ischemic vascular disease might explain lower rates of antiplatelet medication prescribed in the group at risk for ischemic vascular disease compared with other reports (*24*). Patients who had evidence of ischemic or atherosclerotic disease of the brain, heart, or peripheral vasculature but had not experienced a stroke or myocardial infarction were

TABLE 2. Aspirin and other antiplatelet medication prescribed at outpatient visits among patients at risk for developing ischemic vascular disease* — National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey, United States, 2005–2008

Characteristic	Aggregate 2005–2008 Sample no.	Aggregate 2005–2008 (%) (n = 9,369)†	Antiplatelet medication prescribed % (SE) 2005–2006 Yes (n = 771)		2005–2006 No (n = 3,613)		2007–2008 Yes (n = 1,030)		2007–2008 No (n = 3,955)	
Age groups (yrs)										
45–54 (men only)	**3,556**	**(38.0)**	11.8	(1.5)	88.2	(1.5)	12.2	(1.3)	87.8	(1.3)
55–64	**2,626**	**(28.0)**	17.0	(2.3)	83.0	(2.3)	15.7	(1.7)	84.3	(1.7)
65–79	**3,187**	**(34.0)**	22.9	(2.1)	77.1	(2.1)	22.3	(1.8)	77.7	(1.8)
Sex										
Female	**1,632**	**(17.4)**	16.9	(2.5)	83.1	(2.5)	21.7	(2.4)	78.3	(2.4)
Male	**7,737**	**(82.6)**	16.9	(1.4)	83.1	(1.4)	16.2	(1.2)	83.8	(1.2)
Race/Ethnicity										
White, non-Hispanic	**5,911**	**(63.1)**	18.2	(1.5)	81.8	(1.5)	16.8	(1.3)	83.2	(1.3)
Black, non-Hispanic	**1,805**	**(19.3)**	9.1	(2.0)	90.9	(2.0)	16.9	(2.2)	83.1	(2.2)
Hispanic	**1,080**	**(11.5)**	13.0	(3.5)	87.0	(3.5)	19.6	(2.7)	80.4	(2.7)
Other	**573**	**(6.1)**	18.6	(6.5)	81.4	(6.5)	17.2	(4.0)	82.8	(4.0)
Region§										
Northeast	**2,461**	**(26.3)**	16.8	(2.8)	83.2	(2.8)	17.6	(3.0)	82.4	(3.0)
Midwest	**2,227**	**(23.8)**	18.9	(2.7)	81.1	(2.7)	21.8	(2.4)	78.2	(2.4)
South	**3,079**	**(32.9)**	15.4	(1.8)	84.6	(1.8)	16.1	(1.8)	83.9	(1.8)
West	**1,602**	**(17.1)**	17.5	(3.9)	82.5	(3.9)	14.1	(2.1)	85.9	(2.1)
Source of payment (n = 9,169)										
Private	**3,495**	**(38.1)**	16.0	(1.8)	84.0	(1.8)	14.4	(1.5)	85.6	(1.5)
Medicare	**3,181**	**(34.7)**	22.1	(2.1)	77.9	(2.1)	21.9	(1.7)	78.1	(1.7)
Medicaid	**1,216**	**(13.3)**	9.7	(3.7)	90.3	(3.7)	13.1	(2.3)	86.9	(2.3)
Other	**1,277**	**(13.9)**	7.3	(1.7)	92.7	(1.7)	16.0	(2.6)	84.0	(2.6)
Systolic blood pressure (n = 8,549)										
Systolic <140	**5,413**	**(63.3)**	18.3	(1.6)	81.7	(1.6)	17.9	(1.5)	82.1	(1.5)
Systolic 140–159	**2,224**	**(26.0)**	17.3	(2.1)	82.7	(2.1)	18.7	(1.8)	81.3	(1.8)
Systolic ≥160	**912**	**(10.7)**	11.2	(2.4)	88.8	(2.4)	14.1	(2.7)	85.9	(2.7)
Major reason for visit (n = 9,230)										
Preventive care	**1,227**	**(13.3)**	19.9	(3.6)	80.1	(3.6)	15.0	(2.3)	85.0	(2.3)
New problem	**2,457**	**(26.6)**	12.6	(1.6)	87.4	(1.6)	12.8	(1.5)	87.2	(1.5)
Chronic	**5,546**	**(60.1)**	18.3	(1.6)	81.7	(1.6)	19.5	(1.6)	80.5	(1.6)
Enrolled in disease management program										
Enrolled/ordered/advised to enroll	**1,797**	**(19.2)**	18.9	(3.1)	81.1	(3.1)	21.1	(2.4)	78.9	(2.4)
Not enrolled	**2,649**	**(28.3)**	17.0	(1.8)	83.0	(1.8)	17.4	(2.3)	82.6	(2.3)
Unknown/Not applicable	**4,923**	**(52.6)**	16.2	(1.8)	83.8	(1.8)	16.0	(1.3)	84.0	(1.3)
Diabetes										
Yes	**4,548**	**(48.5)**	20.0	(2.0)	80.0	(2.0)	18.3	(1.5)	81.7	(1.5)
No	**4,821**	**(51.5)**	14.9	(1.3)	85.1	(1.3)	16.1	(1.3)	83.9	(1.3)
Hypertension										
Yes	**7,091**	**(75.7)**	19.2	(1.5)	80.8	(1.5)	18.6	(1.3)	81.4	(1.2)
No	**2,278**	**(24.3)**	10.3	(1.7)	89.7	(1.7)	11.7	(1.8)	88.3	(1.8)
Hyperlipidemia										
Yes	**4,380**	**(46.8)**	21.7	(1.9)	78.3	(1.9)	20.7	(1.7)	79.3	(1.7)
No	**4,989**	**(53.3)**	11.0	(1.4)	89.0	(1.4)	12.5	(1.2)	87.5	(1.2)
Congestive heart failure										
Yes	**365**	**(3.9)**	35.0	(8.4)	65.0	(8.4)	26.4	(4.4)	73.6	(4.4)
No	**9,004**	**(96.1)**	16.5	(1.3)	83.5	(1.3)	16.8	(1.1)	83.2	(1.1)
Total	**9,369**		**16.9**	**(1.3)**	**83.1**	**(1.3)**	**17.1**	**(1.1)**	**82.9**	**(1.1)**

Abbreviation: SE = standard error.

* The patient population at risk for developing ischemic vascular disease was defined according to the guidelines issued by the U.S. Prevention Services Task Force, which recommends the use of aspirin to reduce the risk for myocardial infarctions among men aged 45–79 years and to reduce the risk for stroke among women aged 55–79 years.

† Denominator used equals 9.369 unless otherwise specified by category.

§ *Northeast*: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. *Midwest*: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. *South*: Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. *West*: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

included in the ischemic vascular disease category (consistent with NQF quality measures #0068 [*25*], "Use of aspirin or other antithrombotic for ischemic vascular disease" and #0076 [*26*], "Percentage of adult patients aged 18–75 years who have ischemic vascular disease with optimally managed modifiable risk factors [low-density-lipoprotein (LDL), blood pressure, tobacco-free status, daily aspirin use.") Reasons for nonadherence to prescribing, whether at the patient or provider level, cannot be assessed; however, a recent study indicated that elderly patients frequently perceive the use of cardiovascular preventive medications as having greater risk for harm and side effects than benefit (*27*).

USPSTF recommends shared decision making between patient and physician for patients who are at risk for developing ischemic vascular disease. Patient-centered care regarding the use of aspirin for prevention of vascular disease events involves consideration of the individual patient's potential of experiencing a vascular event, their potential of sustaining harm from aspirin, and the patient's preference after discussing these considerations in consultation with their health-care provider (*8,28–31*). On the basis of this analysis, the opportunity exists for physicians to improve compliance with existing clinical guidelines for aspirin use to prevent the recurrence and progression of ischemic vascular disease.

Multiple reasons might account for low prevalence of prescribing aspirin or other antiplatelet medications. First, providers might lack knowledge of clinical guidelines. Second, different reasons for the visit might compete with counseling for physicians' time, and this might differ by provider type or payment source. Finally, physicians might be less likely to prescribe aspirin or other antiplatelet medications when they expect their patients not to adhere to their advice. These possibilities warrant future research.

Physician prescribing of aspirin requires a careful estimate of the benefit provided by aspirin and the potential harm attributable to aspirin, including shared decision making between patient and health-care provider. The American College of Cardiology and the American Heart Association recommend that patients have a comprehensive cardiovascular health assessment at least every 5 years starting at age 18 years and that those with cardiovascular risk factors (e.g., diabetes, hypertension, or tobacco use) should have their cardiovascular health risk assessed more frequently (*14,29*). The Patient Protection and Affordable Care Act of 2010 (as amended by the Healthcare and Education Reconciliation Act of 2010 and referred to collectively as the Affordable Care Act [ACA]) (*32*) provides several opportunities to assist in cardiovascular prevention with medications, promoting health risk assessment and patient-centered health care. The Affordable Care Act provides for a health-risk assessment in the annual wellness visit for Medicare patients, as well as counseling services aimed at reducing risk factors for chronic disease, including heart disease and stroke are provided in the Affordable Care Act (ACA §4103). In December 2011, CDC issued a framework for patient-centered health risk assessments (*33*). This framework is designed to provide health-care providers, payors, and policymakers with information on ways to increase adherence to evidence-based guidelines for prevention of chronic disease and to improve health outcomes through early identification of modifiable health risk factors and early implementation of behavior change interventions to prevent chronic disease such as heart disease and stroke.

The National Strategy to Improve Health Care Quality (ACA §3011) calls for promoting the most effective prevention and treatment practices for the leading causes of mortality, starting with cardiovascular disease, and includes efforts to decrease preventable hospitalizations such as those due to adverse drug events (e.g., hemorrhagic complications from antiplatelet use); promote treatment according to guidelines through quality improvement initiatives such as the Physician Quality Reporting System (ACA §3002), development of quality measures (ACA §3012), and meaningful use; accountable care organizations to better coordinate patient care and improve quality; create community health teams that coordinate prevention and disease management and support primary care providers (ACA §3502); and develop medication management services by pharmacists that can increase patient adherence (ACA §3503).

In September 2011, the U.S. Department of Health and Human Services launched Million Hearts (*34*), a national initiative to prevent 1 million heart attacks and strokes over the next 5 years. Led by CDC and the Centers for Medicare and Medicaid Services, the Million Hearts initiative aims to improve heart disease and stroke prevention by improving access to effective care, improving the quality of care, focusing more clinical attention on heart attack and stroke prevention, increasing public awareness of how to lead a heart-healthy lifestyle, and increasing the consistent use of high blood pressure and cholesterol medications. Improving appropriate use of aspirin through adherence to clinical guidelines, quality improvement initiatives, use of electronic medical records with programmed physician reminders, and academic detailing (academic educational outreach to physicians on current guidelines and best practices) has the potential to prevent cardiovascular events and improve the quality of life in patients with ischemic vascular disease. Coordinating disease management for patients with complex chronic disease can assist in optimizing vascular care and decreasing risk factors for vascular disease.

The findings in this report are subject to at least six limitations. Many of these limitations relate to the distinction between actual aspirin use in compliance with the USPSTF recommendations versus receipt of a prescription during the visit assessed by the survey. First, prescribing aspirin and other antiplatelet medications is contraindicated in patients with diseases that put them at high risk for bleeding or in combination with other medications that augment the risk for bleeding. An underestimation of aspirin use might have occurred because the ability to identify those conditions definitively is limited because only three ICD-9-CM codes per visit were permitted. Second, this analysis cannot assess instances in which providers considered aspirin use for patients who met the USPSTF guidelines but elected not to prescribe the medication based on a risk assessment and the patient's informed decision. Nonprescribing based on patient preference with respect to perceived benefit and harm is not captured in this analysis. Therefore, a higher percentage of physicians might be discussing aspirin with their patients than is reflected by what is documented as having been prescribed. Third, aspirin is an over-the-counter drug, so physicians might not be as likely to document aspirin use as they would be to document use of other prescription drugs. This might lead to an underestimation of providers' compliance with guidelines and recommendations. Fourth, data on required risk factors frequently were absent. For example, information on tobacco use was missing at 28.1% of visits during 2005–2006 and 27.5% of visits during 2007–2008 among those without ischemic vascular disease. For systolic blood pressure, the missing percentage was 3.8% during 2005–2006 and 7.1% during 2007–2008 for visits among those with ischemic vascular disease. In addition, certain risk factors (e.g., left ventricular hypertrophy and atrial fibrillation) would only be identified from one of the three visit ICD-9-CM visit diagnosis codes and might also be underestimated. This missing information might lead to underestimation of persons with a high enough risk for stroke or myocardial infarction to warrant consideration of aspirin or antiplatelet medications; it might also be differential with respect to patient characteristics. Fifth, the analysis was limited to primary care physicians and specialties most likely to care for patients with ischemic vascular disease or at high risk for ischemic vascular disease. Although this analysis indicated that cardiologists prescribed aspirin more frequently than primary care providers, this difference might reflect which provider assumes the prime role in addressing the patient's CVD rather than reflect awareness of USPSTF guidelines. Finally, NAMCS and NHAMCS are representative of patient visits rather than individual patients. Therefore, patients who visit their doctors most frequently such as those who are sicker could potentially be represented more often in the survey. This bias might lead to an overestimation of aspirin use although this bias is presumed to be small given that NAMCS and NHAMCS surveys each physician practice for only a 1-week period. NCHS has taken steps to address some of the limitations inherent in this current analysis by gathering more detailed information regarding care delivered to patients with cardiovascular disease risk factors over time. In particular, in 2012, NAMCS and NHAMCS will include modules to gather data regarding care delivered during the 12 months before the sampled visit for patients with cardiovascular disease risk factors such as hypertension, hypercholesterolemia, and prior stroke. For each prior visit, this new module includes data on medications prescribed, changes in medications, family history, and contraindications to certain medications. These changes in data collection methods should make it possible to better identify patients at risk for CVD per USPSTF guidelines who are without contraindication to aspirin therapy and better understand how prescribing aspirin and antiplatelet medications fits into patients' broader treatment patterns over time (*35*).

Conclusion

The findings provided in this report indicate that aspirin and other antiplatelet medication prescribing among patients with ischemic vascular disease increased from 32.8% in 2003 (*16*) to 46.9% during 2007–2008. Caution should be used in interpreting the magnitude of this change because of changes in the survey methods over time, which could bias comparisons with previous studies. However, these rates can serve as a baseline to track progress and measure the impact of use of preventive services as provided for in the Affordable Care Act. Increased use of aspirin and other antiplatelet medications according to established guidelines for patients with ischemic vascular disease is likely to reduce incident and recurrent myocardial infarctions and stroke substantially. Because CVD and stroke are leading causes of disability and death, efforts to improve access to prevention through health risk assessments and early identification of modifiable health risk behaviors, the implementation of accountable care organizations to better coordinate care and improve quality of care for patients with chronic disease, and medication therapy management services by pharmacists are important steps in providing appropriate aspirin and other antiplatelet medications to patients with or at risk for cardiovascular disease. The Affordable Care Act provides opportunities with respect to all these aspects of care. Continued public and private partnerships can provide opportunities to maximize use of clinical preventive services such as prescribing aspirin and other antiplatelet medications to reduce the incidence of CVD and stroke.

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Control of Hypertension Among Adults — National Health and Nutrition Examination Survey, United States, 2005–2008

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Introduction

Cardiovascular disease (CVD) is the leading cause of preventable death in the United States, and approximately 1 million heart attacks and 700,000 strokes occur annually (*1*). Hypertension is a major risk factor for cardiovascular disease and stroke; the unadjusted prevalence of hypertension among U.S. adults aged ≥18 years is approximately 31% (representing 68 million adults), and hypertension increases with age to approximately 70% among persons aged ≥65 years (*2*). Hypertension contributes to one out of every seven deaths in the United States, and approximately 70% of persons who have a first heart attack or stroke or who have heart failure have hypertension (*1*). In clinical trials, treatment of hypertension was associated with substantial reductions in stroke incidence (35%–40%), myocardial infarction (20%–25%), and heart failure (>50%) (*3*). The estimated annual direct costs of hypertension are approximately $69.9 billion, and the estimated annual indirect costs are $23.6 billion (*4*).

Hypertension is defined as having a systolic blood pressure of ≥140 mm Hg or a diastolic blood pressure of ≥90 mm Hg (*5*). The U.S. Preventive Services Task Force guidelines for the prevention of hypertension call for hypertension screening in adults aged ≥18 years (a grade A recommendation: strongly recommended) (*6*). The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC7) recommended screening every 2 years in persons with blood pressure of <120/80 mm Hg and every year for those with a systolic blood pressure of 120–139 mm Hg or diastolic blood pressure of 80–89 mm Hg (*5*). Once treatment has been initiated in patients identified with hypertension, monthly follow-up and adjustment of medications is recommended until the blood pressure goal is reached. Because the relationship between systolic blood pressure and diastolic blood pressure and cardiovascular risk is continuous and graded, the actual level of blood pressure elevation should not be the sole factor when making treatment decisions. Clinicians also should consider the patient's overall cardiovascular risk profile, including smoking, diabetes, abnormal blood lipid values, age, sex, sedentary lifestyle, and obesity (*5*). In addition to pharmacologic therapy for hypertension control, nonpharmacologic therapies (e.g., reduction of dietary sodium intake, potassium supplementation, increased physical activity, weight loss, and reduction of alcohol intake) are associated with a reduction in blood pressure (*7*). This report analyzes 2005–2008 data from the National Health and Nutrition Examination Survey (NHANES) to determine the prevalence of hypertension treatment and control among U.S. adults. Public health authorities and clinicians can use these data to identify population subgroups that might require additional strategies to access preventive services needed to control hypertension.

Methods

To estimate the percentage of adults aged ≥18 years with hypertension whose blood pressure is under control, CDC analyzed data from NHANES from two survey cycles: 2005–2006 and 2007–2008. NHANES is a complex, multistage probability sample of the noninstitutionalized U.S. population.* Mobile examination center response rates for NHANES during the study period were 76%.† A total of 11,154 participants aged ≥18 years were interviewed and examined. An average of up to three blood pressure measurements was obtained under standard conditions as part of a single physical examination at a mobile examination center. Women who were pregnant or whose pregnancy status could not be determined (n = 505) were excluded, as were participants who did not have complete data to determine hypertension status (n = 601) or who were missing covariates

*Additional information is available at http://www.cdc.gov/nchs/nhanes.htm.
†The response rate is the percentage of persons who were examined among all screened persons.

of interest (n = 66). Some participants were excluded on the basis of more than one criteria, yielding an eligible sample of 10,043 persons; of these, 3,567 (35.5% unweighted) had hypertension and were included in this analysis.

Approximately 95% of the participants had two or three complete blood pressure measurements. Hypertension was defined as having an average systolic blood pressure of ≥140 mmHg, an average diastolic blood pressure of ≥90 mmHg, or self-reported current use of blood pressure–lowering medication. Treatment of blood pressure was defined as the self-reported current use of blood pressure–lowering medication, and its prevalence was calculated among all those defined as having hypertension. Blood pressure control was defined as having an average systolic blood pressure of <140 mmHg and diastolic pressure of <90 mmHg, and its prevalence was calculated among all those defined as having hypertension. Blood pressure control among persons who were treated was defined as an average systolic blood pressure of <140 mmHg and diastolic pressure of <90 mmHg, and its prevalence was calculated among persons who self-reported current use of blood pressure–lowering medication. Hypertension treatment, control, and control among treated estimates were analyzed by diagnosed diabetes and chronic kidney disease (CKD)status and by certain demographic characteristics (i.e., sex, age group, race/ethnicity, poverty-income ratio,[§] education level, health insurance status,[¶] having a usual source of medical care,[**] the number of times medical care was received in the previous year,[††] and the type of place most often visited for health care[§§]). Diagnosed diabetes is based on a participant's positive response to the question, "Other than during pregnancy, have you ever been told by a doctor or health professional that you have diabetes or sugar diabetes?" CKD was defined as estimated glomerular filtration rate of <60 mL/min/1.73 m^2 calculated or albumin-creatinine ratio of ≥30 mg/g (*8*). Participants with missing data for CKD were assumed to be negative.

All analyses were conducted by using statistical software to account for sampling weights and to adjust variances for the multistage, clustered sample designs. Estimates for prevalence of hypertension were standardized to the age distribution of the 2000 U.S. standard population, based on the following age groups: 18–29, 30–39, 40–49, 50–59, 60–69, 70–79, and ≥80 years. Estimates of treatment and control among those with hypertension and control among those treated were standardized to the age distribution of the 2000 U.S. standard population, based on the following age groups: 18–49, 50–59, 60–69, 70–79, and ≥80 years.

To assess trends over time for the prevalence of hypertension, treatment, control, and control among treated, CDC analyzed data from the most recent five available NHANES cycles (1999–2000, 2001–2002, 2003–2004, 2005–2006, and 2007–2008). Estimates from single cycles were standardized to the age distribution of the 2000 U.S. standard population based on the following age groups: 18–39, 40–59, 60–74, and ≥75 years. Logistic regression models, adjusted for sex, age group, and race/ethnicity, were used to test for statistically significant trends over time. Tests were considered statistically significant at the p<0.01 level.

Results

The findings indicate that prevalence of hypertension in U.S. adults did not change significantly from 1999–2000 (28.7%) to 2007–2008 (29.5%) (p = 0.41). However, the prevalence of treatment, control among all persons with hypertension and control among persons taking blood pressure–lowering medication increased during the 10-year period 1999–2008 (Figure).

During 2005–2008, the age-standardized prevalence of hypertension among U.S. adults was approximately 29.3%. The prevalence of hypertension among persons with diabetes or CKD was 42.9%. Persons with diabetes or CKD accounted for 24.6% of U.S. adults with hypertension. Among all persons with hypertension, the age-standardized estimated prevalence of pharmacologic treatment during 2005–2008 was 61.7% (Table). Control of hypertension among all persons with hypertension was 43.6%, and control was 71.7% among persons who reported that they were currently taking blood pressure–lowering medication. The prevalence of treatment was lower among persons without diabetes or CKD (58.9%) compared with those with diabetes or CKD (70.8%). The prevalence of treatment was lowest among males (54.9%), persons aged 18–39 years (37.4%), Mexican-Americans (45.3%), those without a usual source of medical care (19.3%), those who reported receiving medical care less than twice

[§] Poverty-income ratio defined as the family income relative to the family size and age of the members adjusted for inflation using the poverty thresholds developed by the U.S. Census Bureau.

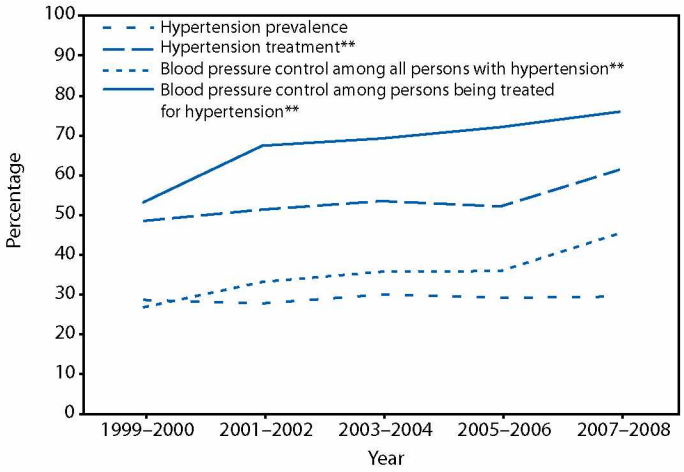
[¶] Private insurance, Medicare, and public insurance include all public non-Medicare coverage, with the exception of the Indian Health Service (IHS). Uninsured includes participants with IHS or single-service plan only.

[**] Participants were asked, "Is there a place that you usually go when you are sick or need advice about your health?" "Yes" responses include those who answered "yes" or "there is more than one place."

[††] Participants were asked, "During the last 12 months, how many times have you seen a doctor or other health professional about your health at a doctor's office, a clinic, hospital emergency room, at home or some other place? Do not include times you were hospitalized overnight."

[§§] Participants were asked "What kind of place do you go to most often: is it a clinic, doctor's office, emergency room, or some other place?" Answers were categorized as 1) a clinic, health center, or hospital outpatient department; 2) a doctor's office or HMO; or 3) a hospital emergency room, other place, or none.

FIGURE. Estimated prevalence of hypertension,* hypertension treatment,† and blood pressure control§ among adults aged ≥18 years — National Health and Nutrition Examination Survey, United States, 1999–2008¶



* Hypertension defined as an answer of "yes" to the question, "Are you currently taking medication to lower your blood pressure?" or an average systolic blood pressure of ≥140 mm Hg, or an average diastolic blood pressure of ≥90 mm Hg (unweighted denominator = 23,489).

† Treatment defined as an answer of "yes" to the question, "Are you currently taking medication to lower your blood pressure?" Calculated among those with hypertension (unweighted denominator = 8,321).

§ Blood pressure control defined as an average systolic blood pressure of <140 mm Hg and an average diastolic blood pressure of <90 mm Hg. Calculated among those with hypertension (unweighted denominator = 8,321) and among those being treated (unweighted denominator = 5,435).

¶ Standardized to the age distribution of the 2000 U.S. standard population. Weighted estimates.

** Multivariable logistic regression analysis indicated a significant linear increase over time after adjusting for sex, age group, and race/ethnicity (p<0.0001).

during the previous year (27.2%), those who reported being uninsured (41.9%), and those who reported usually receiving care at a hospital emergency room or other location (26.3%). The prevalence of control was lowest among males (38.8%), persons aged 18–39 years (31.4%), Mexican-Americans (32.0%), those without a usual source of medical care (10.8%), those who received medical care fewer than two times in the previous year (17.1%), those who reported being uninsured (26.5%), and those who reported usually receiving care at a hospital emergency room, other location or none (16.7%). The prevalence of control among persons who were treated was lowest among persons with diabetes or CKD (60.3%) compared with persons without these conditions and among persons aged ≥65 years (58.8%) (Table).

Discussion

The results of this analysis demonstrate that while the prevalence of hypertension remained flat at approximately 30% during 1999–2008, the prevalence of hypertension treatment and control increased steadily during the 10-year period. Despite this progress, prevalence of treatment, control among all persons with hypertension, and control among persons who were treated are lower among certain subgroups of the population. Persons aged 18–39 years had the lowest prevalence of treatment and control compared with persons aged ≥40 years, but younger persons who reported that they were currently taking hypertension medications had the highest control levels (84.1%) among the three age groups surveyed. Persons with diabetes or CKD had a higher prevalence of treatment compared with those without these conditions (70.8% versus 58.9%), but control among persons who were treated was lower for persons with diabetes or CKD (60.3% versus 76.0%). Control rates for persons with diabetes or CKD would have been even lower if control were defined as <130/80 mm Hg for these groups at high risk for CVD as recommended by the American Diabetes Association and the National Kidney Foundation (*9*,*10*). Persons with diabetes or CKD might visit a clinician more frequently and are likely to be under treatment for hypertension as part of their chronic care management, but the complexity of the multiple comorbidities might make the hypertension more difficult to control.

The most disadvantaged persons in terms of treatment and control are those with no usual source of health care, those who received medical care fewer than two times in the previous year, those who were uninsured, and those who reported usually receiving care at a hospital emergency room, receiving care at some other location, or not receiving care. However, despite low levels of treatment and control for persons without regular access to primary health care, those who reported that they were taking hypertension medications currently achieved levels of control similar to persons who had regular access to primary care. On the basis of this analysis, approximately 18 million adults with hypertension have no usual source of care, receive care fewer than two times per year, are uninsured, or usually receive care at an emergency room or other location, representing 37% of the adult population with hypertension.

Impending changes in the U.S. health-care system offer opportunities to increase prevalence of preventive services to control hypertension. The Patient Protection and Affordable Care Act of 2010 (as amended by the Healthcare and Education Reconciliation Act of 2010 and referred to collectively as the

TABLE. Estimated prevalence* of blood pressure treatment and control among all adults (aged≥18 years) with hypertension, and control among adults treated† — National Health and Nutrition Examination Survey, United States, 2005–2008

Characteristic	No. persons with hypertension¶	Treatment among persons with hypertension** %	(95% CI)	Control among all persons with hypertension†† %	(95% CI)	No. persons treated¶	Control among persons treated§§ %	(95% CI)
Morbidity								
Diabetes or CKD§	1,292	70.8	(64.8–76.2)	42.4	(35.9–49.1)	1,018	60.3	(53.0–67.2)
No diabetes or CKD	2,275	58.9	(55.3–62.4)	44.2	(41.5–46.9)	1,509	76.0	(72.3–79.4)
Total	**3,567**	**61.7**	**(58.6–64.8)**	**43.6**	**(40.9–46.4)**	**2,527**	**71.7**	**(68.5–74.7)**
Sex								
Male	1,770	54.9	(50.3–59.3)	38.8	(35.0–42.9)	1,166	71.6	(65.9–76.7)
Female	1,797	71.4	(68.1–74.5)	51.3	(48.1–54.5)	1,361	72.3	(68.7–75.7)
Age group (yrs)								
18–39	261	37.4	(30.2–45.2)	31.4	(24.6–39.1)	101	84.1	(74.9–90.3)
40–64	1,600	65.6	(61.9–69.2)	47.2	(44.1–50.3)	1,110	72.1	(67.8–76.1)
≥65	1,706	79.6	(77.2–81.8)	47.0	(44.2–49.8)	1,316	58.8	(55.9–61.7)
Race/Ethnicity¶¶								
White, non-Hispanic	1,842	62.6	(58.3–66.7)	46.1	(42.8–49.5)	1,335	74.8	(71.3–78.1)
Black, non-Hispanic	954	67.4	(63.5–71.1)	41.4	(37.6–45.2)	706	61.9	(57.0–66.6)
Mexican-American	442	45.3	(39.2–51.6)	32.0	(27.2–37.2)	272	73.9	(65.4–80.8)
Poverty-income ratio* **								
<100%	551	67.3	(60.1–73.8)	43.5	(35.0–52.5)	390	65.3	(55.4–74.0)
100%–199%	1,571	60.7	(54.4–66.6)	40.2	(33.8–46.8)	1,093	67.0	(60.4–73.0)
200%–499%	618	63.1	(57.1–68.7)	46.4	(41.6–51.4)	448	74.5	(67.1–80.6)
≥500%	563	60.3	(53.1–67.0)	46.9	(40.9–53.0)	413	79.3	(72.4–84.9)
Education (age ≥25 yrs)								
Less than high school	1,184	57.8	(49.6–65.6)	35.8	(27.5–45.1)	815	62.8	(52.9–71.7)
High school graduate	925	65.0	(60.3–69.4)	46.9	(41.1–52.7)	671	73.1	(66.3–79.0)
Some college	829	65.2	(59.2–70.9)	44.6	(39.3–50.1)	601	68.8	(62.7–74.2)
College graduate	578	63.3	(55.1–70.8)	49.7	(42.8–56.6)	433	79.7	(72.4–85.4)
Usual source of care†††								
Yes	3,329	66.6	(63.0–70.0)	47.5	(44.5–50.5)	2,476	72.1	(69.0–75.0)
No	238	19.3	(13.9–26.2)	10.8	(6.7–17.1)	51	59.4	(33.6–80.9)
No. times received health care in past 12 months§§§								
0–1	680	27.2	(22.9–31.9)	17.1	(13.1–22.0)	221	65.8	(52.3–77.1)
2–3	2,173	74.5	(70.8–77.9)	53.2	(49.4–57.0)	1,715	71.7	(67.4–75.7)
≥4	714	74.3	(67.0–80.4)	54.5	(47.8–61.1)	591	74.2	(67.5–79.9)
Health insurance status¶¶¶								
Medicare	1,788	79.6	(64.5–89.3)	62.3	(48.6–74.3)	1,399	78.5	(70.2–84.9)
Private	1,032	61.6	(55.9–67.0)	42.5	(38.9–46.2)	694	69.5	(64.4–74.1)
Public	308	70.1	(59.7–78.8)	49.4	(39.6–59.2)	233	72.2	(64.9–78.5)
Uninsured	439	41.9	(34.6–49.6)	26.5	(20.4–33.7)	201	62.7	(52.5–72.0)
Type of place usually receive care****								
Clinic/Health center/Hospital outpatient	675	59.6	(50.8–67.9)	41.4	(32.6–50.9)	490	70.6	(61.8–78.1)
Doctor's office/HMO	2,543	69.1	(65.6–72.4)	49.6	(46.5–52.7)	1,928	72.4	(68.8–75.7)
Hospital ER/Other/None	349	26.3	(20.6–33.1)	16.7	(12.1–22.5)	109	64.9	(48.9–78.2)

Abbreviations: CI = confidence interval; CKD = chronic kidney disease; HMO = health maintenance organization; ER = emergency room.

* Weighted estimates standardized to the age distribution of the 2000 U.S. standard population.

† Hypertension defined as either 1) an answer of "yes" to the question, "Are you currently taking medication to lower your blood pressure?" 2) an average systolic blood pressure of ≥140 mm Hg, or 3) an average diastolic blood pressure of ≥90 mm Hg.

§ Diabetes defined by self-reported diabetes. CKD defined as estimated glomerular filtration rate of <60 mL/min/1.73 m^2 calculated or albumin-creatinine ratio of ≥30 mg/g. Participants missing data for CKD were assumed to be negative.

¶ Unweighted sample size.

** An answer of "yes" to the question, "Are you currently taking medication to lower your blood pressure?" Asked of those with hypertension.

†† Average blood pressure <140/90 mmHg on examination among all persons with hypertension.

§§ Average blood pressure of <140/90 mmHg on examination among all persons reporting current use of medications.

¶¶ Participants of other racial/ethnic groups included in analysis, but are not reported.

*** Poverty-Income Ratio is an index for the ratio of family income to poverty as defined by the U.S. Census Bureau. Available at http://www.census.gov/hhes/www/poverty/methods/definitions.html#ratio of income to poverty.

††† Participants were asked, "Is there a place that you usually go when you are sick or need advice about your health?" "Yes" responses include those who answered "yes" or "there is more than one place."

§§§ Participants were asked, "During the last 12 months how many times have you seen a doctor or other health professional about your health at a doctor's office, a clinic, hospital emergency room, at home, or some other place? Do not include times you were hospitalized overnight."

¶¶¶ Medicare includes all participants who had Medicare. Private does not include those participants with Medicare. Public insurance includes participants who reported only Indian Health Service. Uninsured includes participants with single service plan only.

**** Participants were asked, "What kind of place do you go to most often: is it a clinic, doctor›s office, emergency room, or some other place?"

Affordable Care Act [ACA]) expands insurance coverage, consumer protections, and access to primary care (*11,12*). The law expands Medicaid to cover persons with incomes up to 133% of the federal poverty level (ACA §2001). Starting in 2014, state-based insurance exchanges[†††] will provide access to health insurance for small employers and to persons and families not eligible for Medicaid or the Children's Health Insurance Program, and federal tax credits will help those living at 100%–400% of the federal poverty level (ACA §1311). The Affordable Care Act also provides for guaranteed issue of insurance, ending denials of coverage for preexisting conditions (hypertension is considered a preexisting condition by certain insurers) (ACA §1201), and prohibits rescission (dropping coverage), lifetime coverage limits, and limits on emergency room use. The law also expands access to primary care by increasing funding to community health centers, which provide primary health-care services to uninsured and underserved populations (ACA §5601.) The primary care workforce will be strengthened through provisions that increase funding for the National Health Service Corps to increase the number of providers in underserved areas; provide incentives to expand the number of primary care physicians, nurse practitioners, and physician assistants; and offer scholarships and loan repayments for those working in underserved areas. Increasing access to primary care and increasing the proportion of persons with a usual care provider can lead to better diagnosis, treatment, and control of hypertension.

Hypertension screening in adults aged ≥18 years is a grade A recommendation from USPSTF (*6*) and therefore is covered without cost sharing as of January 1, 2011, by Medicare (ACA §4104) and will be covered by the new health exchanges that go into effect starting in 2014 (ACA §1001). Beginning January 1, 2013, state Medicaid programs that offer U.S. Preventive Services Task Force grade A or B services at no cost sharing will receive an enhanced federal matching rate. Currently, the U.S. Preventive Services Task Force has not given a grade A or B recommendation to existing clinical guidelines for hypertension treatment and management, which means that hypertension treatment and management are subject to cost sharing. However, provisions of the Affordable Care Act might reduce patient out-of-pocket costs for clinician visits and hypertension medications. These include an essential health benefits package (ACA §1302) that limits cost sharing and includes preventive and wellness services, prescription drugs, and chronic disease management. Each state will determine which evidenced-based clinical services will be included in the state's essential health benefits package. Clinical services for controlling hypertension (e.g., team-based coordination of care and reducing or eliminating cost-sharing for medications and other services such as lifestyle counseling) might be beneficial because studies indicate that hypertension control is one of the preventive services with the greatest potential for preventing deaths (*13–15*).

Persons aged ≥65 years accounted for 38% of persons with hypertension in this study. For such persons, the Affordable Care Act makes several changes to Medicare Part D to reduce patient out-of-pocket costs for prescription drugs. In 2010, Medicare beneficiaries who reached the coverage gap (the difference of the initial coverage limit and the catastrophic coverage) in expenses were eligible to receive a $250 rebate from Medicare. Beginning in 2011, Medicare beneficiaries reaching the coverage gap will be given a 50% discount on the total cost of brand name drugs while in the gap and pay a reduced rate for generic medications. Medicare will phase in additional discounts on the cost of both brand name and generic drugs. By 2020, these changes will effectively close the coverage gap and rather than paying the full cost of prescription drugs while in the gap, a senior's responsibility will be 25% of the costs (*16*).

The American College of Cardiology and the American Heart Association recommend that patients have a comprehensive cardiovascular health assessment at least every 5 years starting at age 18 years, and that those with cardiovascular risk factors such as diabetes or hypertension or those who smoke cigarettes should have their cardiovascular health risk assessed more frequently (*17*). A health risk assessment is provided for in the annual wellness visit for Medicare, as are counseling services aimed at reducing risk factors for chronic disease, including hypertension, heart disease, and stroke (ACA §4103). In December 2011, CDC issued a framework for patient-centered health risk assessments for persons aged ≥65 years (*18*).

The management of hypertension is also likely to benefit from provisions of the Affordable Care Act that call for improving health-care quality and making system-level changes to health-care delivery. The National Strategy to Improve Health Care Quality (ACA §3011) calls for promoting the most effective prevention and treatment practices for the leading causes of mortality, starting with CVD, and includes efforts to decrease preventable hospitalizations and readmissions (*19*). Hospitalization for hypertension, also referred to as an ambulatory-care–sensitive condition, is preventable; such hospitalization could be avoided if patients were to receive early and continued access to quality health care (*20*). Other quality improvement initiatives that might promote treatment according to guidelines for hypertension

[†††] Beginning in 2014, a competitive insurance marketplace will be set up in the form of state-based insurance exchanges. These exchanges will allow eligible persons and small businesses with up to 100 employees to purchase health insurance plans that meet criteria outlined in the Affordable Care Act (ACA §1311). If a state does not create an exchange, the federal government will operate it.

control include the Physician Quality Reporting System (ACA §3002), the development of quality measures (ACA §3013) and meaningful use of clinical data (*21*), incentives for physicians to join accountable care organizations to better coordinate patient care and improve quality, creation of community health teams that can coordinate prevention and disease management and support primary care providers (ACA §3502), and the development of medication management services by pharmacists that can increase patient adherence to prescribed medications (ACA §3503). Quality improvement efforts that improve the care of patients with hypertension can have substantial public health impact because even small improvements in blood pressure control can reduce the risk of cardiovascular disease. Health system changes might be of particular value to persons with hypertension who also have diabetes or CKD as the complexity of the therapeutic regimes for these patients might benefit from better coordinated disease management. In September 2011, as part of national health quality improvement efforts, the U.S. Department of Health and Human Services launched the Million Hearts national initiative (*22*) to prevent 1 million heart attacks and strokes over the next 5 years. Led by CDC and the Centers for Medicare and Medicaid Services, the Million Hearts initiative aims to improve heart disease and stroke prevention by improving access to effective care, improving the quality of care, focusing more clinical attention on heart attack and stroke prevention, increasing public awareness of how to lead a heart-healthy lifestyle, and increasing the consistent use of high blood pressure and cholesterol medications.

Improving the management of hypertension will require further efforts. For example, standardization of health information technology that allows exchange of clinical data between health-care providers could increase awareness of hypertension diagnosis and control among all of a patient's providers. Adoption of electronic health records that include decision support tools that prompt clinicians to ask patients about medication adherence also could improve the management of hypertension (*23*). Barriers to hypertension medication adherence should be addressed (e.g., costs, health literacy, lack of perceived benefit, and multiple comorbidities) and nonpharmacologic approaches that can reduce blood pressure should be emphasized (e.g., adoption of a healthy diet that includes reduction of dietary sodium intake, increased physical activity, weight loss, smoking cessation, and reduction of alcohol intake) (*7*).

The findings in this report are subject to at least three limitations. First, the population of persons with hypertension in this study might underestimate the U.S. population of persons with hypertension because older persons residing in nursing homes and other institutions, who have a higher prevalence of age-related hypertension, are not included in NHANES. Second, although data collection is standardized, NHANES self-reported data on the use of blood pressure medications and diagnosis of diabetes from interviews and questionnaires are subject to inaccuracies or recall bias. Finally, the estimated prevalence of adults with hypertension might be underestimated because only persons who had measured high blood pressure during the examination and those who reported taking pharmacologic treatment to achieve control of hypertension were included in the analysis. Certain participants who might have received a diagnosis of hypertension previously but who had normal blood pressure measurements during the examination, perhaps as a result of life-style habits (e.g., diet and exercise), were not included as having hypertension in the analysis.

Conclusion

Hypertension control has the potential to prevent a substantial number of deaths because although hypertension is common (affecting approximately 30% of the U.S. adult population), therapeutic interventions are effective, and control rates are below achievable levels (*13*). If implementation of health-care reform increases the number of people with regular access to primary care and access to affordable medications, it could have a substantial impact on control of hypertension in the U.S. population.

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Screening for Lipid Disorders Among Adults — National Health and Nutrition Examination Survey, United States, 2005–2008

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Introduction

Cardiovascular disease (CVD) is the leading cause of preventable death in the United States (*1*), a major contributor to adult disability (*2*), and one of the most expensive conditions treated in U.S. hospitals (*3*). Lipid disorders (e.g., high blood cholesterol and triglycerides) increase the risk for atherosclerosis, which can lead to coronary heart disease (CHD), which accounts for a substantial proportion of cardiovascular mortality (*1*). Screening for lipid abnormalities is essential in detecting and properly managing lipid disorders early in the atherogenic process, thereby preventing the development of atherosclerotic plaques and minimizing existing plaques. Based on evidence-based studies, the United States Preventive Services Task Force (USPSTF) concluded that lipid measurement can identify asymptomatic adults who are eligible for cholesterol-lowering therapy (*4*).

According to USPSTF, the preferred screening tests for dyslipidemia or lipid disorders are total cholesterol (TC) and high-density lipoprotein cholesterol (HDL-C) on fasting or nonfasting samples. Screening recommendations are classified as having a rating of A (strongly recommended) or B (recommended) on the basis of sex, age, and risk factors for CHD (Box). USPSTF also stated that a complete fasting lipoprotein panel (i.e., TC, HDL-C, low-density lipoprotein cholesterol [LDL-C] and triglycerides [TG]) is useful for persons with dyslipidemia identified through TC and HDL-C screening tests, although they did not specify the numerical cut-points for determining lipid disorders (*4*). According to USPSTF, reasonable screening intervals include every 5 years with shorter or longer intervals depending on screening results (*4*).

In addition to the USPSTF guidelines, lipid disorder screening recommendations also have been published by the National Cholesterol Education Program (NCEP) (*5*), which recommends a complete fasting lipoprotein profile (TC, LDL-C, and TG) for all adults aged ≥20 years as the preferred screening test. In general, NCEP recommends target levels for fasting TC of <200 mg/dL, HDL-C of >60 mg/dL, TG of <100 mg/dL, and LDL-C of <100 mg/dL. NCEP treatment goals focus on LDL-C and vary depending on a history of, or the risk for, developing CHD: <100 mg/dL for those considered at high risk, <130 mg/dL for those considered at intermediate risk, and <160 mg/dL for those considered at low risk.

Recent population-based reports on the prevalence of screening for lipids (*6*), lipid levels (*7,8*), and the prevalence,

BOX. U.S. Preventive Services Task Force recommendations for lipid disorders screening — United States, 2008

Sex	Age group (yrs)	Increased risk for CHD*	Rating†
Male	20–34	No	
		Yes	B
	≥35	No	A
		Yes	A
Women	20–44	No	
		Yes	B
	≥45	No	
		Yes	A

Abbreviation: CHD = coronary heart disease.
* Increased risk for CHD includes one or more of the following conditions: diabetes (determined by self-reported diabetes, fasting plasma glucose≥126 mg/dL, or glycohemoglobin (A1c) ≥6.5%), history of CHD, family history of a heart attack or angina before age 50 years, current cigarette smoking (self-reported smoking every day or some days or a measured serum cotinine level of >10mg/ml), hypertension (average systolic blood pressure of ≥140 mmHg, average diastolic blood pressure of ≥90 mmHg, or self-reported currently taking blood pressure–lowering medication), and obesity (body mass index [weight (kg)/height m2] of ≥30).
† A = benefits of screening substantially outweigh the potential harms; B = benefits of screening moderately outweigh the potential harms.

treatment, and control of high LDL-C using NCEP CHD risk categories have been published (*9*), but these reports did not address the outcomes in terms of USPSTF lipid disorder screening recommendations, i.e., by the groups recommended or eligible for screening.

This report analyzes 2005–2008 data from the National Health and Nutrition Examination Survey (NHANES) to determine what proportion of the adult population should be screened for cholesterol based on the USPSTF recommendations, the prevalence of lipid screening among those for whom screening is recommended, and the prevalence of high LDL-C, LDL-C treatment and control by screening recommendation category. The results of this report will provide baseline estimates that researchers can use to track potential improvement over time in lipid screening as well as progress in LDL cholesterol treatment and control among those who are at increased risk for CVD.

Methods

To determine 1) the percentage of adults aged ≥20 years within each USPSTF-recommended screening category determined by sex, age, and CHD risk factors (0 or ≥1); 2) the prevalence of lipid screening within the previous 5 years by sex, age, and USPSTF screening category; 3) the percentage of those within each USPSTF screening category for whom a fasting full lipid panel would be useful based on the NCEP guidelines for fasting or nonfasting mean TC or HDL-C; and 4) the prevalence, treatment, and control of high LDL-C within each USPSTF screening category, CDC analyzed 2005–2008 NHANES data.

NHANES is a nationally representative cross-sectional survey of the health and nutritional status of the U.S. civilian, noninstitutionalized population (*10*). Although NHANES data are collected continuously, the data are released in 2-year cycles. The survey includes a household interview and a detailed physical examination. A subsample of study participants is selected randomly, and participants are asked to fast before the physical examination. Participants are included in the fasting subsample if they have fasted for 8–24 hours before blood is drawn for lipid testing. NHANES data were aggregated and analyzed from two survey periods (2005–2006 and 2007–2008). During 2005–2008, the overall survey response rate for adults aged ≥20 years was 70.8%; 10,480 adults aged ≥20 years took part in the home interviews and were examined at NHANES mobile examination centers. After exclusion of participants who were pregnant or for whom needed data were missing, the examination sample comprised 8,485 adults and the fasting sample comprised 3,427 adults.

Participants were classified into USPSTF-recommended sex, age, and risk categories for lipid screening. In accordance with USPSTF guidelines and available NHANES data, participants with one or more of the following conditions were assessed as having an increased risk for CHD: diabetes (ever told they had diabetes, fasting glucose of ≥126 mg/dL, or glycohemoglobin [A1C] of ≥6.5%), personal history of CHD (ever told they had CHD, heart attack, or angina), family history of heart attack or angina before age 50 years in close relatives (blood relatives including father, mother, sisters, or brothers), current cigarette smoking (self-reported smoking every day or some days or a measured serum cotinine level of >10 ng/mL), hypertension (an average of up to three blood pressure measurements of ≥140/90 mmHg or self-reported current use of antihypertensive medication), and obesity (body mass index [weight (kg)/height $(m)^2$] ≥30). Detailed methods for using 2005–2008 NHANES data to categorize persons by level of CHD risk into one of the three NCEP risk groups for LDL-C–lowering therapy have been described elsewhere (*9*). In addition to estimating the proportion of the sample within each USPSTF recommendation group, researchers estimated the prevalence of cholesterol screening and the prevalence of TC ≥200 mg/dL or HDL-C <40 mg/dL. The prevalence, treatment, and control of high LDL-C were estimated by sex and screening recommendation group among the fasting subsample. Treatment was defined as self-reported use of cholesterol-lowering medication among those with high LDL-C; prevalence of control was defined as having a fasting LDL-C below the NCEP treatment goals, depending on CHD risk, and was calculated among all persons with high LDL-C.

National estimates and 95% confidence intervals were calculated using SAS-callable SUDAAN (Research Triangle Institute, Research Triangle Park, North Carolina) and applying appropriate survey statistical weights for the examination sample or the fasting subsample to account for the probability of selection and nonresponse. Univariate chi-square tests of independence were used to assess differences in prevalence between the screening recommendation groups. Tests were considered statistically significant at the $p<0.01$ level.

Results

According to the USPSTF guidelines, 88.7% of the U.S. adult population aged ≥20 years should be screened for lipid abnormalities (Table 1). The USPSTF recommendation for screening applies to 94.4% of all adult men, including 76.2% of adult men being eligible under the grade A recommendation and 17.8% being eligible under the grade B recommendation. Among all adult women, the recommendation for screening

TABLE 1. Prevalence of lipid screening* and estimated prevalence of elevated total or low high-density lipoprotein cholesterol (HDL-C) among adults† aged ≥20 years, by U.S. Preventive Services Task Force (USPSTF) lipid screening recommendation categories§ — National Health and Nutrition Examination Survey, United States, 2005–2008

Screening recommendation group	No.¶	Sample distribution		Total screened		Elevated total or low HDL-C††	
		%**	(95% CI)	%	(95% CI)	%	(95% CI)
Total	**8,485**	**100.0**		**68.4**	**(66.6–70.3)**	**57.5**	**(56.0–59.0)**
Recommendation A or B	7,707	88.7	(87.6–89.8)	70.1	(68.3–71.8)§§	59.4	(57.9–60.8)§§
Recommendation A	5,914	64.8	(62.9–66.7)	77.7	(75.7–79.6)	62.4	(60.7–64.0)
Recommendation B	1,793	23.9	(22.4–25.4)	49.3	(46.0–52.7)¶¶	51.3	(48.1–54.5)¶¶
No recommendation	778	11.3	(10.2–12.4)	55.6	(51.8–59.3)	42.7	(38.5–47.1)
Men	**4,537**	**52.2**	**(51.2–53.2)**	**64.4**	**(61.8–67.0)**	**59.8**	**(57.7–61.9)**
Recommendation A or B	4,326	94.4	(93.3–95.4)	66.6	(64.0–69.1)§§	61.0	(58.9–63.0)§§
Recommendation A	3,630	76.6	(74.4–78.7)	73.6	(70.9–76.2)	61.8	(59.7–64.0)
Recommendation B	696	17.8	(16.2–19.5)	36.5	(32.4–40.8)¶¶	57.3	(52.3–62.2)
No recommendation	211	5.6	(4.6–6.7)	27.5	(20.4–35.9)	39.7	(32.1–47.7)
Women	**3,948**	**47.8**	**(46.8–48.8)**	**72.8**	**(70.9–74.7)**	**55.0**	**(52.8–57.2)**
Recommendation A or B	3,381	82.5	(80.6–84.2)	74.4	(72.2–76.5)§§	57.4	(55.0–59.7)§§
Recommendation A	2,284	52.0	(49.3–54.6)	84.3	(82.3–86.1)	63.2	(60.8–65.5)
Recommendation B	1097	30.5	(28.3–32.8)	57.6	(53.7–61.3)¶¶	47.5	(43.3–51.7)¶¶
No recommendation	567	17.5	(15.8–19.4)	65.3	(61.4–69.1)	43.8	(38.8–48.9)

* Cholesterol screening within the past 5 years determined by the response to the question "Have you ever had your blood cholesterol checked?" and response to the question: "About how long has it been since you last had your blood cholesterol checked? Has it been...Less than 1 year ago, 1 year but less than 2 years ago, 2 years but less than 5 years ago?"

† Excluding pregnant women.

§ USPSTF recommends screening for lipid disorders for all men aged ≥35 years (grade A recommendation: benefits of screening substantially outweigh the potential harms) and men aged 20–34 years (grade B recommendation: benefits of screening moderately outweigh the potential harms), women aged 20–44 years (grade B recommendation), and women aged ≥45 years (grade A recommendation) who are at increased risk for coronary heart disease. Risks include diabetes (determined by self-reported diabetes, fasting plasma glucose≥126 mg/dL, or glycohemoglobin of ≥6.5%), history of coronary heart disease (CHD), family history of a heart attack or angina before age 50, current smoker, hypertension (average systolic blood pressure of ≥140 mmHg, average diastolic blood pressure of ≥90 mmHg, or self-reported currently taking blood pressure–lowering medication), and obesity (body mass index [BMI] [kg/m2] of ≥30).

¶ Unweighted sample size.

** All estimates are calculated using the examination sample weight.

†† Serum total cholesterol of ≥200 mg/dL or serum HDL cholesterol of <40 mg/dL.

§§ Univariate χ^2 tests of independence significant (p<0.01): grade A or B recommendation versus no recommendation.

¶¶ Univariate χ^2 tests of independence significant (p<0.01): grade A recommendation versus grade B.

applies to 82.5%, including 52.0% being eligible under the grade A recommendation and 30.5% being eligible under the grade B recommendation. The grade A recommendation applies to the majority of adults aged ≥20 years (64.8%), with the remaining 23.9% for whom screening is recommended being eligible under the grade B recommendation. Among adults for whom screening is recommended, 70.1% reported having their cholesterol checked within the previous 5 years. Two thirds (66.6%) of men for whom screening is recommended reported having their cholesterol checked within the previous 5 years; the prevalence among women recommended for screening was 74.4%. The prevalence of cholesterol screening was higher among those who were eligible under either the grade A or grade B recommendation compared with those for whom no recommendation is made (70.1% versus 55.6%, respectively; p<0.01); this pattern was observed among both men and women. The prevalence of screening was higher among the grade A–eligible participants than it was among the grade B–eligible participants (77.7% versus 49.3%, respectively; p<0.01); this pattern also was observed in both men and women. Although the prevalence of elevated TC or low HDL-C was higher among those eligible for lipid screening based on the USPSTF recommendations, 42.7% of those to whom the screening recommendations do not apply had cholesterol levels indicating that a full fasting lipid panel would be warranted. The prevalence of high TC or low HDL-C among men not eligible for screening under the USPSTF recommendations was 39.7%, and among women not eligible for screening the prevalence was 43.8%.

The prevalence of high LDL-C (LDL-C greater than the NCEP goal or current lipid-lowering medication use) was higher among those for whom screening is recommended, compared with those for whom the recommendations do not apply (40.5% versus 13.7%, respectively; p<0.01) (Table 2). This significant difference also was observed among women (41.6% versus 17.4%, respectively; p<0.01). The prevalence of high LDL-C also was higher among the grade A–eligible participants compared with the grade B–eligible participants (48.8% versus 18.0%, respectively; p<0.01); this pattern also was observed among both men and women. The prevalence of treatment among those with high LDL-C was higher among those eligible for screening compared with those not eligible

TABLE 2. Estimated prevalence of high low-density lipoprotein cholesterol (LDL-C)*, treatment,† and control§ of high LDL-C by eligibility for screening under U.S. Preventive Services Task Force recommendations,¶ adults aged ≥20 years — National Health and Nutrition Examination Survey, United States, 2005–2008.**

Screening recommendation group¶	High LDL-C (n = 3,472)††		Treated (n = 1,427)		Control (n = 1,427)	
	%§§	(95% CI)	%	(95% CI)	%	(95% CI)
Total	**36.1**	**(33.2–39.1)**	**46.4**	**(42.6–50.2)**	**33.5**	**(30.2–36.9)**
Men	36.0	(32.4–39.7)	43.5	(38.8–48.3)	31.8	(27.7–36.4)
Women	36.3	(32.6–40.1)	49.7	(44.5–54.9)	35.3	(30.6–40.2)
Recommendation A or B						
Total	**40.5**	**(37.5–43.5)*****	**47.0**	**(43.0–51.0)*****	**33.2**	**(29.5–37.1)*****
Men	39.6	(35.9–43.5)	44.5	(39.7–49.4)	32.6	(28.3–37.2)
Women	41.6	(37.4–45.9)***	50.1	(44.4–55.8)***	34.0	(28.5–40.0)***
Recommendation A						
Total	**48.8**	**(45.7–52.0)**	**51.2**	**(47.5–54.8)**	**36.6**	**(33.0–40.4)**
Men	45.6	(41.5–49.7)	47.6	(43.2–52.1)	34.9	(30.6–39.5)
Women	54.1	(50.0–58.0)	56.0	(49.8–62.0)	39.0	(32.9–45.4)
Recommendation B						
Total	**18.0**	**(13.7–23.3)††††**	**16.6**	**(8.8–29.2)††††**	**—**	
Men	15.7	(11.1–21.9)††††	—		—	
Women	19.7	(14.5–26.1)††††	—		—	
No recommendation						
Total	**13.7**	**(10.1–18.5)**	**37.3**	**(24.3–52.4)**	**37.2**	**(24.2–52.2)**
Men	—¶¶		—		—	
Women	17.4	(12.9–23.2)	46.1	(31.1–61.8)	45.9	(31.0–61.7)

* The National Cholesterol Education Program's Adult Treatment Panel III risk categories based on the risk for developing coronary heart disease (CHD) in the next 10 years were used to examine LDL-C levels. High LDL-C was defined as ≥100 mg/dL for the high-risk group, ≥130 mg/dL for the intermediate risk group, and ≥160 mg/dL for the low-risk group, or self-reported currently taking cholesterol-lowering medication. Additional information available at http://www.nhlbi.nih.gov/guidelines/cholesterol/index.htm

† Self-reported currently taking cholesterol-lowering medication among those with high LDL-C (LDL-C ≥100 mg/dL for the high-risk group, ≥130 mg/dL for the intermediate risk group, ≥160 mg/dL for the low-risk group or reported current lipid-lowering medication use).

§ Among those with high LDL-C or currently taking lipid-lowering medication, control was defined as having a LDL-C level <100 mg/dL for the high-risk group, <130 mg/dL for the intermediate risk group, and <160 mg/dL for the low-risk group.

¶ The U.S. Preventive Services Task Force recommends screening for lipid disorders for all men aged ≥35 years; men aged 20–34 years if they are at increased risk for CHD, and women aged ≥20 years if they are at increased risk for CHD.

** Pregnant women were excluded from analyses.

†† Unweighted sample size.

§§ All estimates are calculated using the morning fasting sample weight.

¶¶ Estimates unstable by NCHS standards (RSE>30%) are suppressed.

*** Univariate χ^2 tests of independence significant (p<0.01): grade A or B versus no recommendation.

†††† Univariate χ^2 tests of independence significant (p<0.01): grade A versus grade B.

for screening (47.0% versus 37.3%, respectively; p<0.01). A similar pattern was observed among women (50.1% among those eligible for screening versus 46.1% among those not eligible for screening; p<0.01); however, the difference between men recommended for screening compared with men not recommended for screening could not be assessed as a result of small cell sizes and unstable estimates. A statistically significant difference was noted in prevalence of treatment observed between those in the grade A recommendation group compared with the grade B recommendation (51.2% for grade A versus 16.6% for grade B; p<0.01). Sample sizes did not allow for comparisons in treatment prevalence between the specific recommendation grades within genders. The prevalence of LDL-C control was significantly lower among all persons with high LDL-C for whom screening is recommended compared with those for whom screening is not recommended (33.2% versus 37.2%, respectively), and this pattern also was observed among women (34.0% among those eligible for screening versus 45.9% among those not eligible for screening; p<0.01). Sample sizes did not allow for comparisons in LDL-C control prevalence between the specific recommendation grades.

Discussion

The findings in this report indicate that 88.7% of U.S. adults aged ≥20 years are eligible for cholesterol screening per the USPSTF guidelines and that 68.4% of those eligible for screening reported being screened for cholesterol during the previous 5 years. National Health Interview Survey data for 2008 indicated that 74.6% of adults aged ≥18 years reported having had their blood cholesterol checked within the preceding 5 years (*6*). The distribution of persons into USPSTF groups by

recommended lipid disorder screening status indicated that the highest percentages of persons screened (77.7%) were found in the two categories with a grade A recommendation (men aged ≥35 years and women aged ≥45 years at increased risk for CHD). On the basis of lipid levels, persons not recommended for lipid disorder screening were classified appropriately using the USPSTF guidelines. Similarly, a study using USPSTF recommendations to assess the proportion of persons exceeding their NCEP LDL-C goals indicated that 88% of the persons not recommended for screening had LDL-C levels at NCEP goals (*11*). A full lipid panel based on TC or HDL-C values would be useful for a sizeable proportion of participants in the groups not recommended for screening. Rates of treatment for high LDL-C cholesterol do not appear to be higher among those for whom screening is recommended compared with those that fall outside the criteria for recommended screening, indicating a potential need for improvement in treatment among patients at an increased risk for CHD.

Adults without health insurance are less likely than those with insurance to be tested for high cholesterol, and, if they have high cholesterol, they are less likely to receive a diagnosis and have their high cholesterol under control (*12*). Implementation of the provision in the Patient Protection and Affordable Care Act of 2010 (as amended by the Healthcare and Education Reconciliation Act of 2010 and referred to collectively as the Affordable Care Act [ACA]) (ACA §1001) that eliminates cost sharing for those persons enrolled in new plans who meet the USPSTF lipid disorder screening grade A and B recommendations would identify persons at increased risk for CHD who would benefit from early detection of lipid disorders and early management of lipid disorders (*13*). Starting in 2014, these services will be covered at no cost sharing by newly qualified private health plans operating in state-based insurance exchanges.* Moreover, beginning in 2013, state Medicaid programs that eliminate cost sharing for these clinical preventive services will receive enhanced federal matching funds for them (ACA §4106) (*13,14*). In addition, the Affordable Care Act ensures that preventive and wellness services be provided without cost-sharing to Medicare recipients (ACA §4104), a group comprising persons most in need of lipid management. However, recommendations for follow-up and lipid-lowering management after screening are not included in the USPSTF recommendations (*15*).

The findings in this report are subject to at least three limitations. First, this report might underestimate lipid levels of the U.S. population because NHANES does not include persons living in institutions such as nursing homes, and the prevalence of lipid disorders increases with age. Second, persons who received a diagnosis of a lipid disorder were not excluded from the study; the percentage of persons who were eligible for screening might be overestimated because the classification of participants was not restricted to asymptomatic persons when determining the USPSTF sex, age, and CHD risk groups or the lipid levels. Finally, using the cut-points of TC ≥200 mg/dL or HDL-C <40 mg/dL to estimate the percentage of persons for whom a full lipid panel would be useful is based on a combination of USPSTF and NCEP guidelines. USPSTF recommends complete lipid testing based on fasting or nonfasting TC or HDL levels without providing specific cut-points for estimating CHD risk. NCEP includes these cut-points but indicates that they are to be used when a fasting measure is not available. However, the combined measure has value for estimating the prevalence of being referred for a full lipid profile by USPSTF screening categories.

Conclusion

Approximately 70% of the U.S. adult population who meet the criteria for lipid screening reported having their cholesterol checked within the last 5 years, a percentage that is well below the *Healthy People 2020* target of 82.1%. Because the Affordable Care Act reduces cost sharing for lipid screening, monitoring the prevalence of lipid screening among adults who meet the USPSTF or NCEP criteria is needed to determine if screening increases over time. Because lowering LDL cholesterol is associated with a decrease in the onset of subsequent CHD, and because the effectiveness of LDL-C drug therapy is well established, monitoring the treatment and control of LDL cholesterol in the population also will be important as a measure of improvements intended by the Affordable Care Act.

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*Beginning in 2014, a competitive insurance marketplace will be set up in the form of state-based insurance exchanges. These exchanges will allow eligible persons and small businesses with up to 100 employees to purchase health insurance plans that meet criteria outlined in the Affordable Care Act (ACA §1311). If a state does not create an exchange, the federal government will operate it.

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Characteristics Associated with Poor Glycemic Control Among Adults with Self-Reported Diagnosed Diabetes — National Health and Nutrition Examination Survey, United States, 2007–2010

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Introduction

Nationally representative estimates indicate that 18.8 million adults in the United States have received a diagnosis with diabetes mellitus (*1*). When glycemic control is not optimized, diabetes imposes additional burdensome care requirements, health-care costs, and high risk of disabling complications, and this has been especially evident in socioeconomically disadvantaged and minority populations (*2*). For example, higher levels of glycated hemoglobin (A1c) have been associated with increased risk of diabetic retinopathy (*3*), increased risk of chronic kidney disease (*4*), and increased risk of cardiovascular disease (*5*). Reducing A1c levels through combined clinical and effective self-management has demonstrated reduced risk for microvascular complications (*6,7*). Although the most appropriate target A1c levels to achieve optimal health impact might vary among persons, the majority of adults with diabetes will benefit from reduction of A1c levels to ≤7%; targets for patients with a history of severe hypoglycemia, or with limited life expectancy, or with advanced complications, or with certain comorbid conditions might be higher (*8*). Nevertheless, an A1c level of 9% constitutes a clearly modifiable, high level of risk that few, if any, persons with diabetes should be exposed to. Accordingly, the *Healthy People 2020* objectives (*9*) include a 10% reduction in the proportion of the diabetes population that has poor glycemic control (A1c >9%) as a target.

This report evaluates the levels of glycemic control achieved among U.S. adults with diagnosed diabetes by demographic, socioeconomic, clinical, and health-care access-related characteristics, and identifies the gaps in glycemic control nationally. These data also serve as a baseline for future evaluations of how ongoing expansions of access to health insurance will affect diabetes care and control.

Methods

To estimate the proportions and characteristics of U.S. adults aged ≥18 years with self-reported diagnosed diabetes experiencing inadequate glycemic control, CDC analyzed pooled data from the 2007–2008 and 2009–2010 cycles of the National Health and Nutrition Examination Surveys (NHANES). These serial cross-sectional surveys use stratified multistage probability cluster sampling to ensure adequate representation of the United States' noninstitutionalized civilian population. NHANES data are collected through household interviews, standardized medical examinations, and blood sample collection in mobile examination centers (*10*). Overall survey exam response rates were 75.4% (for 2007–2008) and 77.3% (for 2009–2010). This analysis included 1,350 nonpregnant adults aged ≥18 years with self-reported diabetes. Self-reported diagnosed diabetes was defined as a respondent's positive response to the question of whether they had ever been told by a health-care provider or other health professional that they had diabetes other than during pregnancy.

Glycated hemoglobin was measured in all NHANES participants aged ≥12 years from whole blood samples and standardized to reference methods from the Diabetes Control and Complications Trial. In all adult participants with self-reported diagnosed diabetes, the proportion with poor glycemic control (represented by most recent A1c >9.0% reflecting National Diabetes Quality Improvement Alliance indicators) (*11*) was estimated. Crude estimates of the proportion of adults with poor glycemic control were then calculated, stratifying by demographic (age group, sex, race/ethnicity, and marital status), socioeconomic position (e.g.,

age group, sex, education, and poverty-income ratio*), clinical (e.g., time since diagnosis of diabetes, and glucose-lowering medication type) and health-care access-related characteristics (e.g., health insurance status,† number of times medical care was received in the previous year,§ and usual source of medical care¶). All estimates were standardized to the age distribution of the population with diagnosed diabetes in NHANES 2009–2010. Multivariable logistic regression was conducted to compute the adjusted prevalence of poor glycemic control (A1c >9.0%) in each category, adjusting for all other exposures (e.g., age and socioeconomic position). Categorical results were deemed statistically significant using the Satterthwaite-adjusted F-test if $p<0.05$.

Results

During 2007–2010, an estimated 12.9% of U.S. adults with self-reported diagnosed diabetes exhibited poor glycemic control (Table).

Poor glycemic control was least common among those aged ≥65 years (6.8%) and most common among adults aged 18–39 years (24.2%). The proportion of non-Hispanic blacks (18.7%) and Hispanics (18.8%) with poor glycemic control was greater than the proportion of non-Hispanic whites with poor glycemic control (10.1%). No statistically significant or consistent patterns of association existed between education levels attained, poverty-income ratio group, or sex with poor glycemic control. However, unmarried persons (16.8%) were more likely than married persons (10.3%) to have poor glycemic control. Higher percentages of respondents using insulin therapy alone (20.8%) or combined with other oral glucose-lowering medications (22.3%) exhibited poor glycemic control compared with those reporting no medication use (5.3%) or oral medications only (10.1%). Prevalence of poor glycemic control was highest among the uninsured (28.5%) compared with non-Medicare publicly insured (13.0%), Medicare users (12.6%), and privately insured persons (7.2%). In addition, poor glycemic control was common among those without a usual source of medical care (22.4%) or among those using hospital or emergency departments for their health-care needs (22.9%) compared with 11.2%–15.2% for those accessing clinics or doctors' offices.

In a multivariable analysis controlling for all other sociodemographic, clinical, and economic covariates, adults aged ≥65 years were less likely to have poor glycemic control than young and middle-aged adults (7.3% versus 19.1% and 15.0%, respectively; $p = 0.02$). After controlling for all covariates, non-Hispanic blacks and Hispanics (17.6% and 16.2%, respectively versus 9.7%; $p <0.01$) still exhibited higher prevalence of poor glycemic control compared to non-Hispanic white persons. Marital status also was associated with poor glycemic control (married [9.6%] versus not married [16.1%]; $p = 0.05$). Similarly, independent of all other demographic, socioeconomic, and clinical factors considered, poor glycemic control was more prevalent among the uninsured (20.7%) compared with those on non-Medicare public insurance plans (12.4%), those on Medicare (12.4%), and those with private insurance (9.5%)($p = 0.03$). In a sensitivity analysis, in which age was excluded from the multivariable model, these relationships remained significant ($p<0.001$). The association between usual place of care and poor glycemic control was no longer statistically significant in the multivariable model.

Discussion

Among persons with self-reported diagnosed diabetes, young (aged 18–39 years) and middle-aged adults (aged 40–64 years), non-Hispanic black or Hispanic respondents, those not married, those treated with insulin, and those lacking insurance exhibited substantially higher prevalence of poor glycemic control than their respective comparison groups. Adjusted for all other demographic and socioeconomic covariates considered, poor glycemic control remained persistently more prevalent among young and middle-aged adults, minority groups, those not married, those using insulin, and those with no health insurance coverage, compared with their respective comparison groups. These findings are encouraging because 40.5% of persons with diabetes are aged ≥65 years, and a substantial proportion of them maintain A1c levels of ≤9%. However, the data describe ongoing disparities, especially among high-risk groups that account for a large number

* Poverty-income ratio is an index of household income in relation to family need, based on family size and annual changes in the cost of living using poverty thresholds that are federally established by the U.S. Census Bureau and track the Consumer Price Index. Missing data for poverty-income ratios (n = 150) were imputed.

† Uninsured includes those answering negatively to the following questions: "Are you covered by health insurance or some other kind of health care plan?" and "Do you have Medicare?" (≥65 years only). Medicare recipients include all individuals who had Medicare (including those that have supplemental insurance of another kind). Non-Medicare public insurance recipients include those who reported having any government-sponsored health insurance excluding Medicare (e.g., Medicaid, Medi-Gap, military health care, Indian Health Service). Private insurance recipients include those who answered affirmatively to the question, "Are you covered by private insurance?"

§ Participants were asked, "During the last 12 months, how many times have you seen a doctor or other health professional about your health at a doctor's office, a clinic, hospital emergency department, at home, or some other place? Do not include times you were hospitalized overnight."

¶ Participants were asked, "Is there a place that you usually go when you are sick or need advice about your health?" Those answering "yes" were asked to specify the place (e.g., hospital/emergency department, clinic, or doctor's office).

TABLE. Prevalence* of poor glycemic control (glycated hemoglobin [A1c] >9.0%) among adults† aged ≥18 years with diagnosed diabetes — National Health and Nutrition Examination Survey, United States, 2007–2010

Characteristic	Proportion of diagnosed diabetes population§		Age-standardized prevalence§		Adjusted prevalence¶	
Total	**100.0**		**12.9**	**(11.1–15.0)**	**12.4**	**(10.6–14.2)**
Age group (yrs)						
18–39	8.3	(6.8–10.1)	24.2	(13.7–39.3)	19.1	(8.1–30.1)
40–64	51.2	(48.2–54.1)	15.4	(13.2–18.0)	15.0	(12.5–17.5)
≥65	40.5	(37.5–43.6)	6.8	(5.1–9.0)	7.3	(4.4–10.2)
Sex						
Male	49.7	(45.3–54.1)	14.4	(11.4–17.9)	13.4	(10.5–16.3)
Female	50.3	(45.9–54.7)	11.5	(9.3–14.0)	11.4	(8.9–13.9)
Race/ethnicity**						
White, non-Hispanic	62.7	(54.8–69.9)	10.1	(8.0–12.7)	9.7	(7.7–11.7)
Black, non-Hispanic	16.5	(12.6–21.3)	18.7	(15.7–22.0)	17.6	(14.5–20.7)
Hispanic	13.5	(9.2–19.4)	18.8	(14.7–23.7)	16.2	(10.9–21.5)
Education						
<High school graduate	31.2	(28.4–34.1)	14.7	(11.1–19.1)	13.1	(9.2–17.0)
High school graduate	23.2	(19.0–27.9)	12.2	(8.0–18.0)	11.4	(7.3–15.5)
>High school graduate	45.6	(41.2–50.2)	12.8	(10.3–15.8)	12.4	(9.7–15.1)
Poverty-income ratio††						
<100%	15.5	(12.8–18.5)	16.6	(12.9–21.2)	12.4	(8.5–16.3)
100%–200%	45.7	(41.6–49.9)	11.9	(9.1–15.4)	11.3	(8.9–13.7)
>200%	38.8	(34.8–43.0)	12.1	(8.5–17.0)	13.8	(8.9–18.7)
Marital status						
Married/partner	58.2	(54.4–62.0)	10.3	(7.1–14.6)	9.6	(6.5–12.7)
Not married	41.8	(38.0–45.6)	16.8	(13.5–20.6)	16.1	(12.0–20.2)
Time since diabetes diagnosis (yrs)						
<10	55.5	(52.0–58.9)	10.1	(7.6–13.3)	10.6	(7.5–13.7)
10–15	17.8	(15.7–20.2)	21.5	(14.9–30.1)	21.0	(13.6–28.4)
≥15	26.7	(23.9–29.8)	14.6	(10.6–19.8)	11.0	(7.1–14.9)
Medication						
None	11.6	(9.0–14.9)	5.3	(2.8–10.0)	3.5	(1.3–5.7)
Oral medication only	59.0	(54.7–63.1)	10.1	(7.6–13.2)	10.1	(7.6–12.6)
Insulin only	15.6	(12.9–18.7)	20.8	(14.0–29.8)	21.0	(12.2–29.8)
Oral medication + insulin	13.8	(12.3–15.6)	22.3	(16.8–28.8)	22.5	(16.2–28.8)
Insurance status§§						
Uninsured	10.8	(8.6–13.4)	28.5	(19.5–39.4)	20.7	(14.0–27.4)
Medicare	45.7	(43.7–47.8)	12.6	(8.5–18.2)	12.4	(8.5–16.3)
Public	9.6	(7.8–11.9)	13.0	(9.0–18.5)	12.4	(6.7–18.1)
Private	33.9	(30.5–37.4)	7.2	(4.8–10.8)	9.5	(6.0–13.0)
Doctor visits in past year¶¶						
None	2.6	(1.8–3.7)	19.8	(11.5–32.0)	18.3	(4.6–32.0)
1–3	27.1	(24.3–30.2)	16.0	(12.0–21.1)	15.2	(10.9–19.5)
≥4	70.3	(67.0–73.4)	11.4	(9.2–14.0)	11.0	(8.5–13.5)
Usual source of care***						
No place	2.8	(1.9–4.1)	22.4	(16.0–30.6)	18.7	(7.7–29.7)
Hospital/emergency department	3.7	(2.4–5.5)	22.9	(12.0–39.3)	13.7	(6.3–21.1)
Clinic	18.8	(16.0–22.0)	15.2	(10.5–21.4)	13.4	(8.3–18.5)
Doctor's office	74.7	(70.3–78.6)	11.2	(9.0–13.9)	11.6	(9.1–14.1)

* Weighted prevalence estimates (95% confidence intervals) are reported.

† Sample (n = 1,350) represents U.S. population of nonpregnant adults with diabetes aged ≥18 years.

§ Estimates standardized to the age distribution of the population with diagnosed diabetes in NHANES 2009–2010.

¶ Adjusted prevalence was calculated from multivariate logistic regression of poor glycemic control adjusted for all covariates. The following six categories were statistically significant at p <0.05 using the Satterthwaite-adjusted F-test: age group, race/ethnicity, marital status, time since diabetes diagnosis, medication, and insurance status.

** Because of sample size, estimates for participants of other racial/ethnic groups were not reported.

†† Missing poverty-income ratio values (n = 150) were imputed.

§§ Uninsured includes those answering negatively to the following questions: "Are you covered by health insurance or some other kind of health-care plan?" and "Do you have Medicare?" (aged ≥65 years only). Medicare recipients include all persons who had Medicare (including those who have supplemental insurance of another kind). Non-Medicare public insurance recipients include those who reported having any government-sponsored health insurance excluding Medicare (e.g., Medicaid, Medi-Gap, military health care, or Indian Health Service). Private insurance recipients include those who answered affirmatively to the question, "Are you covered by private insurance?"

¶¶ Participants were asked, "During the last 12 months how many times have you seen a health-care provider or other health professional about your health at a doctor's office, clinic, hospital emergency department, at home, or some other place? Do not include times you were hospitalized overnight."

*** Participants were asked, "Is there a place that you usually go when you are sick or need advice about your health?"

(e.g., non-Hispanic black and Hispanic persons comprise up to 30%) of adults with diabetes in the United States.

The sub-optimal glycemic control observed among young persons might reflect less interaction with the health system stemming from the vulnerable period of age-related transition between parents' and independent insurance coverage. This finding also is consistent with 2007 employee benefit data demonstrating that approximately 23%–32% of U.S. youths and young adults were uninsured (*12*). The association between young adulthood and poor glycemic control was attenuated but was still significant after controlling for demographic and socioeconomic characteristics, suggesting that other barriers to achieving better glycemic control might exist. Future studies are needed to explore this association.

The findings in this report support previous studies demonstrating that social, demographic, and economic exposures are linked closely to health outcomes and might be interconnected (*2,13*). For example, health insurance status influences the likelihood of having a usual health-care provider. Conceivably, the attenuated relationships between regular access to a provider and glycemic control noted in this analysis might be moderated by health insurance status. Our data confirm the importance of health insurance status because a much smaller proportion of persons with any public or private insurance exhibited poor glycemic control than uninsured persons. These data also support previous findings that outcomes for persons with diabetes are similar in publicly funded and commercially managed health systems (*14*). Finally, although insulin use was associated with poor glycemic control, this might more accurately reflect type 1 diabetes or more advanced stage of diabetes requiring aggressive therapy, rather than a causal link with poor glycemic control (*6,15*).

These findings also suggest that glycemic control among persons with diagnosed diabetes has steadily improved since 1988– 2002 (*16*). *Healthy People 2020* targets for glycemic control have already been reached for certain subgroups (e.g., whites, the elderly, and those with a high level of education). The findings of this report can be used to track and evaluate the effects of national and state health reforms. The Patient Protection and Affordable Care Act of 2010 (as amended by the Healthcare and Education Reconciliation Act of 2010 and referred to collectively as the Affordable Care Act [ACA]) (*17*) includes a number of provisions that directly address gaps in diabetes prevention, screening, care, and treatment. The Catalyst to Better Diabetes Care Act of 2009 (ACA §10407) directs the U.S. Department of Health and Human Services and CDC to enhance diabetes surveillance and quality standards across the country. In particular, these agencies were responsible for emphasizing reengineering of vital statistics systems, promoting more accurate classification and collection of diabetes mortality data, preparing biennial national reports that track trends in health outcomes for persons with diabetes and prediabetes that will be made publicly available and that can be used to inform policy and program development, and promoting licensing and certification for providers that care for persons with diabetes. In addition, diabetes is targeted specifically by provisions administering private health insurance wellness and prevention programs (ACA §2717), Medicaid Health Homes for enrollees with chronic conditions (ACA §2703), the Medicaid Incentives to Prevent Chronic Disease program (ACA §4108), and the Medicare Independence at Home Demonstration program (ACA §3024).

More broadly, the Affordable Care Act expands insurance coverage, consumer protections, and access to primary care. The law expands Medicaid to cover persons with incomes up to 133% of the federal poverty level. State-based insurance exchanges** will provide access to health insurance for small employers and to persons and families not eligible for Medicaid or the Children's Health Insurance Program, and federal tax credits will help those living at 100%–400% of the federal poverty level. By 2016, an estimated 95% of the U.S. population will have access to health insurance. Young adults ≥aged 26 years are now eligible to remain on their parents' insurance, and the National Center for Health Statistics reported in December 2011 that 2.5 million additional young adults had been insured. The law also provides for guaranteed issue of insurance, ending denials of coverage for preexisting conditions (diabetes is considered preexisting by certain insurers) and prohibits rescission (dropping coverage), lifetime coverage limits, and limits on emergency department use (*12,17*).

In the context of these reforms, the findings in this report provide a benchmark for future and more detailed national diabetes report cards that focus on persons affected by diabetes. Increasing access to care through insurance and increasing the proportion of persons with a usual care provider might lead to better diagnosis, treatment, and control of diabetes (*18*). In addition, future reports might consider evaluations of system- and provider-focused policies and interventions and their impact on diabetes detection and control. The only empirical data associated with a number of national large-scale population-targeted policies and interventions are related to

** Beginning in 2014, a competitive insurance marketplace will be set up in the form of state-based insurance exchanges. These exchanges will allow eligible persons and small businesses with up to 100 employees to purchase health insurance plans that meet criteria outlined in the Affordable Care Act (ACA §1311). If a state does not create an exchange, the federal government will operate it.

quality improvement strategies (e.g., structured team-based care, reminders, nonphysician health workers, peer support, and provision of feedback to patients) and how this affects efficiency, self-management support, physician responsibilities, and glycemic control (*19*).

The findings provided in this report are subject to at least four limitations. First, the analyses are cross-sectional, which do not provide information regarding temporal or causal association. Second, detailed analyses were confined to those with diagnosed diabetes because the profile and reasons for poor glycemic control would predictably be different between the groups with diagnosed and undiagnosed disease. For groups with undiagnosed diabetes, poor glycemic control is primarily related to lack of awareness of the condition; the public health solution should focus on better detection. Including persons with undiagnosed diabetes might cause the proportion of the population with poor glycemic control to be overestimated, but to potentially have overestimates or underestimates of the associations between poor control and sociodemographic characteristics. Third, the indicator used (A1c>9.0%) might overestimate poor control in African American persons, among whom A1c might be naturally higher (*20*). Finally, no attempt was made to disaggregate data regarding persons with type 1 and type 2 diabetes because glucose control guidelines do not differ by type of diabetes mellitus.

Conclusion

Nationally, sociodemographic disparities in glycemic control among persons with self-reported diagnosed diabetes persist. Improvements in access to health care and benefits, quality of care delivery, and patient adherence might be achieved by more extensive translation of innovative, evidence-based system, provider, and patient-level policies and interventions. Routine surveillance also will be imperative to evaluate the intended and unintended impacts of system-level reforms on sociodemographic disparities in health utilization and diabetes control.

Further study is needed to examine the effects of increasing emphasis on evidence-based guidelines and to monitor quality indicators to determine how incentives affect motivation and accountability among health-care providers. Evaluating the implementation of health information technologies (e.g., electronic health records and computerized decision support systems that aim to motivate provider and patient adherence) will be essential in determining whether to extensively promote adoption. Finally, evaluating health system policies (e.g., assessments of the patient-centered medical home, reduction of copayments for essential medications, and other initiatives) will determine the sustainability of each initiative.

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Tobacco Use Screening and Counseling During Physician Office Visits Among Adults — National Ambulatory Medical Care Survey and National Health Interview Survey, United States, 2005–2009

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Introduction

Tobacco use continues to be the leading cause of preventable disease and death in the United States; cigarette smoking accounts for approximately 443,000 premature deaths annually (*1*). In 2009, the prevalence of smoking among U.S. adults was 20.6% (46 million smokers), with no significant change since 2005 (20.9%) (*2*). In 2010, approximately 69% of smokers in the United States reported that they wanted to quit smoking (*3*). Approximately 44% reported that they tried to quit in the past year for ≥1 day; however, only 4%–7% were successful each year (*4*). Tobacco dependence has many features of a chronic disease: most patients do not achieve abstinence after their first attempt to quit, they have periods of relapse, and they often require repeated cessation interventions (*4*). At least 70% of smokers visit a physician each year, and other smokers visit other health-care professionals, providing key opportunities for intervention (*4*). The 2008 update to the U.S. Public Health Service (PHS) *Clinical Practice Guideline: Treating Tobacco Use and Dependence* recommends that clinicians and health-care delivery systems consistently identify and document tobacco use status and treat every tobacco user seen in a health-care setting using the 5 A's model: 1) ask about tobacco use, 2) advise tobacco users to quit, 3) assess willingness to make a quit attempt, 4) assist in quit attempt, and 5) arrange for follow-up (*4*). The PHS guideline also recommends the following as effective methods for increasing successful cessation attempts: individual, group, and telephone counseling; any of the seven first-line medications for tobacco dependence that are approved by the Food and Drug Administration (FDA); and provision of coverage for these treatments by health-care systems, insurers, and purchasers (*4*). However, clinicians and health-care systems often do not screen for and treat tobacco use consistently and effectively (*4*).

The *Healthy People 2020* objectives for health systems changes related to tobacco cessation include increasing tobacco screening in office-based ambulatory care settings to 68.6% from a baseline of 62.4% among persons aged ≥18 years in 2007 (objective TU 9.1) and increasing tobacco cessation counseling in office-based ambulatory care settings to 21.1% from a baseline of 19.2% among current tobacco users aged ≥18 years in 2007 (objective TU 10.1) (*5*). An overall *Healthy People 2020* objective for adult cessation is increasing recent (i.e., within the past year) smoking cessation success by adult smokers to 8.0% among adults aged ≥18 years who have ever smoked 100 cigarettes, who do not smoke now, and who last smoked ≤1 year ago and among current smokers who initiated smoking at least 2 years ago from a baseline of 6.0% among adults aged ≥18 years in 2008 who ever smoked 100 cigarettes, who do not smoke now, and who last smoked ≤1 year ago and among current smokers who initiated smoking at least 2 years ago (objective TU 5.1) (*5*).

This report summarizes data from the National Ambulatory Medical Care Survey (NAMCS) and the National Health Interview Survey (NHIS) that address the three *Healthy People 2020* objectives (increase screening, increase cessation counseling, and increase overall cessation success) and tobacco medication provision by patient- and physician-related characteristics and presents trends in recent successful cessation among adult smokers by whether they visited a doctor in the past year. These results can be used by researchers and health-care providers to track and improve adherence to the PHS clinical practice guideline on tobacco use and to learn of opportunities for tobacco cessation as a covered health benefit.

Methods

To estimate the percentage of office-based physician visits made by adults aged ≥18 years with documentation of screening for tobacco use, tobacco cessation counseling in the form of health education ordered or provided during those visits, as well as tobacco cessation medications ordered or continued during those visits, CDC analyzed data from the combined

2005–2008 NAMCS. NAMCS is a national probability sample survey of outpatient visits made to office-based physicians that measures health-care use across various health-care providers.

The NAMCS sample included 96,232 outpatient visits among persons aged ≥18 years, ranging from 21,220 visits in 2005 to 27,169 in 2007. The NAMCS estimates for tobacco use screening and tobacco cessation counseling and medications among visits by adults aged ≥18 years were analyzed by patient demographics, tobacco use status, type of health insurance, counseling and education provided, medication continued or ordered, and other physician- or visit-related characteristics. Demographic characteristics include age, sex, and race/ethnicity; length of visit; and type of health insurance (private insurance, Medicare, Medicaid or State Children's Health Insurance Program [SCHIP], self-pay, or other [workers' compensation; no charge or charity; other sources of payment not covered by private insurance, Medicare, Medicaid/SCHIP, workers' compensation, self-pay, and no charge or charity; or unknown]). Physician-related characteristics include practice type (solo or other), specialty, and whether the physician was the patient's primary care physician (determined by response to the question, "Are you the patient's primary care physician/provider?").

For the 2005–2007 NAMCS, respondents who were eligible both for Medicare and Medicaid were categorized as Medicaid recipients for type of health insurance; however, these respondents were classified as Medicare recipients in 2008. To account for this change, the 2005–2007 payment type variable was recoded to be consistent with the 2008 classification for primary expected source of payment. For all survey years, nonphysician providers, federally employed physicians, and physicians in anesthesiology, pathology, and radiology specialties were excluded. The basic sampling unit for NAMCS is the physician-patient encounter or office visit. For physicians whose major professional activity was patient care, only visits classified by the American Medical Association or the American Osteopathic Association as office-based, patient care were included. The survey methods and sampling frame has been described elsewhere (available at http://www.cdc.gov/nchs/ahcd/ahcd_scope.htm#namcs_scope). Additional information on the NAMCS microdata file documentation also is available (ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/NAMCS).

NAMCS defines tobacco use as documentation in the medical chart that the patient is a current user of tobacco, including cigarettes or cigars, snuff, or chewing tobacco. Tobacco cessation counseling is defined as information given in the form of health education to the patient on topics related to tobacco use in any form, including cigarettes, cigars, snuff, and chewing tobacco, or on exposure to secondhand smoke. Tobacco cessation counseling includes information on smoking cessation and prevention of tobacco use, as well as referrals to other health professionals for smoking cessation programs. Medication use includes medications that were ordered, supplied, administered, or continued during the visit. Only medications related to tobacco cessation were analyzed. These medications were entered as free text for each visit and were limited to no more than eight prescription and over-the-counter (OTC) medications. The tobacco cessation medications included nicotine replacement therapy (i.e., nicotine patch, gum, lozenge, nasal spray, and inhaler), bupropion, and varenicline.

To estimate recent smoking cessation success among persons aged ≥18 years, CDC analyzed data from the 2005–2009 NHIS. NHIS is a periodic, nationwide, household survey about the health and health care of a representative sample of the U.S. civilian noninstitutionalized population. The NHIS sample during 2005–2009 included 128,608 adults aged ≥18 years, ranging from 21,781 in 2008 to 31,428 in 2005. Recent smoking cessation success was defined using the *Healthy People 2020* definition (objective TU 5.1) (*5*): former smokers who had ever smoked 100 cigarettes, do not smoke now, and last smoked 6 months to 1 year ago were considered to have had recent smoking cessation success. Former smokers who had ever smoked 100 cigarettes, do not smoke now, and last smoked ≤6 months ago and current smokers who initiated smoking at least 2 years ago were considered to have had unsuccessful recent smoking cessation. Recent smoking cessation success was analyzed by whether the respondent had visited a physician within the last year.

All analyses were conducted using statistical software to account for the complex sample design of both NAMCS and NHIS. Data from NAMCS and NHIS were adjusted for nonresponse and weighted using the 2000 U.S. standard population to provide national estimates of outpatient visits with tobacco screening, tobacco cessation counseling, cessation treatments and successful cessation, respectively; 95% confidence intervals were calculated for both surveys to account for the multistage probability sample design. For NHIS, linear trends were examined using orthogonal polynomial contrasts. Statistical significance of differences between those who saw a physician and those who did not was determined using a t-test, with significance set at $p<0.05$.

Results

During 2005–2008, adults aged ≥18 years made an estimated annual average of approximately 771 million outpatient visits (an estimated total of 3.08 billion visits during 2005–2008

combined) to office-based physicians, ranging from 720 million in 2006 to 799 million in 2007, of which an average annual estimate of approximately 483 million (62.7%) included tobacco screening, an estimated total of 1.93 billion visits during 2005–2008 combined (66.9% in 2005, 61.6% in 2006, 58.7% in 2007, and 63.6% in 2008) (Table). Of the visits in 2005–2008 that included tobacco use screening, 17.6% (340 million visits) were made by current tobacco

TABLE. Receipt of tobacco use screening, counseling, and cessation medication prescriptions during outpatient visits to office-based physicians among adults aged ≥18 years, by patient and physician characteristics — National Ambulatory Medical Care Survey, United States, 2005–2008

Characteristic	Visits with tobacco screening* (n = 60,031†)		Visits with current tobacco use§ (n = 11,376)		Visits with current tobacco use and tobacco counseling¶ (n = 2,258)		Visits with current tobacco use with cessation medication** (n = 488)	
	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Total	**62.7**	**(60.7–64.6)**	**17.6**	**(16.6–18.5)**	**20.9**	**(19.1–22.7)**	**7.6**	**(6.5–8.7)**
Age group (yrs)								
18–24	64.0	(60.9–67.0)	19.0	(16.7–21.3)	19.5	(15.6–24.0)	—††	—
25–44	64.8	(62.7–66.9)	21.8	(20.2–23.4)	17.9	(15.7–20.3)	8.0	(6.1–9.9)
45–64	62.6	(60.4–64.8)	21.0	(19.8–22.2)	22.7	(20.4–25.2)	9.1	(7.3–10.9)
≥65	60.8	(58.6–63.0)	9.9	(9.0–10.7)	22.6	(19.4–25.7)	5.0	(3.1–6.8)
Sex								
Male	61.7	(59.6–63.7)	21.1	(19.8–22.4)	21.9	(19.8–24.1)	7.1	(5.5–8.8)
Female	63.3	(61.3–65.4)	15.5	(14.6–16.3)	20.0	(18.1–22.1)	8.0	(6.5–9.4)
Race/Ethnicity								
White, non-Hispanic	64.1	(62.1–66.1)	18.1	(17.1–19.1)	21.2	(19.3–23.2)	7.8	(6.7–8.8)
Black, non-Hispanic	60.2	(56.7–63.7)	19.5	(17.5–21.4)	18.9	(15.3–23.1)	—	—
Hispanic	57.8	(54.4–61.1)	13.8	(12.2–15.3)	21.0	(17.0–25.7)	10.8	(5.3–16.3)
Asian/Pacific Islander	55.5	(47.3–63.6)	12.2	(10.0–14.4)	23.2	(15.6–33.1)	—	—
American Indian/Alaska Native	55.9	(48.2–63.6)	20.3	(14.0–26.6)	—	—	—	—
Multiple race	61.2	(47.8–74.7)	31.3	(20.1–42.5)	—	—	—	—
Health insurance								
Private insurance	64.8	(62.8–66.9)	17.1	(16.0–18.1)	20.8	(18.7–22.9)	9.7	(8.2–11.2)
Medicare	62.0	(59.7–64.4)	12.5	(11.5–13.4)	22.4	(19.4–25.4)	5.5	(3.7–7.2)
Medicaid/SCHIP	63.4	(59.6–67.3)	33.2	(29.8–36.5)	22.8	(18.7–26.9)	6.2	(3.9–8.5)
Self-pay	63.7	(59.2–68.2)	26.6	(22.6–30.5)	23.5	(17.3–29.6)	—	—
Other§§	50.2	(45.4–54.9)	24.3	(22.0–26.6)	12.5	(8.9–16.0)	8.6	(4.0–13.3)
Primary care physician								
Yes	66.6	(63.9–69.3)	18.7	(17.4–20.1)	26.9	(24.2–29.7)	8.3	(6.6–10.0)
No	61.6	(59.7–63.6)	16.2	(15.3–17.1)	15.5	(13.7–17.3)	6.6	(5.3–8.0)
Solo practice¶¶								
Yes	61.1	(58.0–64.3)	17.7	(16.2–19.1)	22.0	(19.0–25.1)	7.9	(5.7–10.0)
No	63.5	(61.3–65.6)	17.6	(16.6–18.6)	20.2	(18.2–22.3)	7.5	(6.2–8.8)
Physician specialty								
General and family practice	66.4	(62.9–70.0)	21.9	(20.4–23.5)	23.5	(20.7–26.4)	7.6	(5.8–9.5)
Internal medicine	64.3	(60.0–68.6)	17.7	(15.3–20.0)	32.5	(26.7–38.2)	8.8	(5.8–11.7)
Obstetrics and gynecology	69.6	(65.8–73.5)	14.2	(12.3–16.1)	19.7	(14.9–24.5)	—	—
Cardiovascular disease	63.4	(57.3–69.4)	13.7	(11.7–15.7)	35.4	(28.1–42.8)	7.3	(3.9–10.7)
Psychiatry	58.9	(52.9–64.9)	23.4	(20.4–26.5)	20.7	(14.4–26.9)	17.7	(12.5–22.8)
All other specialties	58.2	(55.6–60.9)	15.5	(14.6–16.4)	10.5	(8.4–12.5)	4.5	(3.1–5.9)
Time spent with physician (mins)								
<20	60.9	(58.5–63.3)	17.6	(16.6–18.6)	18.6	(16.8–20.4)	7.5	(6.3–8.8)
≥20	64.9	(62.8–67.0)	17.6	(16.3–18.8)	23.6	(21.0–26.2)	7.7	(6.1–9.2)

Abbreviations: CI = confidence interval; SCHIP = State Children's Health Insurance Program.

* Visits during which current tobacco use (currently smoke cigarettes or cigars or use snuff or chewing tobacco) or no current use was recorded.

† Yearly visits with tobacco screening: 13,721 in 2005; 15,324 in 2006; 16,176 in 2007; and 14,810 in 2008.

§ Visits during which current tobacco use (smoking cigarettes or cigars or using snuff or chewing tobacco) was recorded.

¶ Tobacco counseling refers to any information provided that related to tobacco use in any form, including cigarettes, cigars, snuff, and chewing tobacco, and on exposure to tobacco in the form of secondhand smoke, smoking cessation, and prevention of tobacco use, as well as referrals to other health-care providers for smoking cessation programs.

** Cessation medications include nicotine replacement therapy (nicotine patch, gum, lozenge, nasal spray, and inhaler), bupropion, and varenicline.

†† Data not shown because sample size is <30, or the relative standard error of the estimate is >30%.

§§ Workers' compensation; no charge or charity; other sources of payment not covered by private insurance, Medicare, Medicaid/SCHIP, workers' compensation, self-pay, and no charge or charity; or unknown.

¶¶ Medical practice run by an individual physician; a solo practitioner offering medical services on a person-to-person basis (i.e., not a group practice).

users (17.2% in 2005, 18.3% in 2006, 19.6% in 2007, and 15.4% in 2008).

The prevalence of respondents who received tobacco screening varied by race/ethnicity; Hispanic patients were less likely to receive screening for tobacco use (57.8%) during office-based physician visits than were non-Hispanic white patients (64.1%). Screening also varied by insurance status. Patients with private insurance (64.8%), Medicare (62.0%), Medicaid or SCHIP (63.4%), and self-payers (charges paid by the patient or patient's family and not reimbursed by a third party) (63.7%) were more likely to receive tobacco screening than were patients with workers' compensation, classified as no charge or charity, or covered by a source other than private insurance, Medicare, Medicaid/SCHIP, workers' compensation, self-pay, and no charge or charity, or whose insurance status was unknown (50.2%). Patients who visited their primary care physician were more likely to receive tobacco screening (66.6% of visits) than patients who visited a physician who was not their primary care physician (61.6% of visits). Screening also varied by physician specialty. Patients visiting general or family practitioners (66.4%) and obstetricians/gynecologists (69.6%) were more likely to receive screening than patients who visited physicians in other specialties (58.2%), excluding internal medicine, cardiovascular disease, and psychiatry.

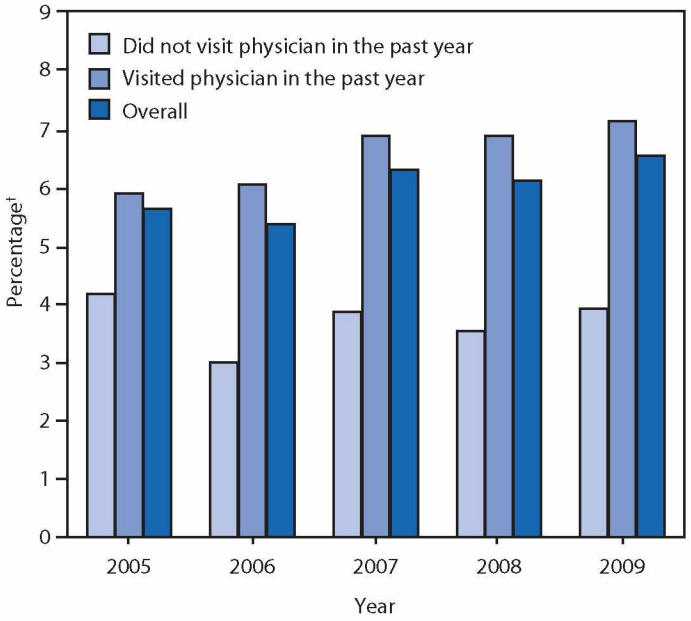
Patients aged <65 years, men, non-Hispanic whites, non-Hispanic blacks, and persons of multiple races were more likely to be current tobacco users than were Hispanics and Asians/Pacific Islanders. Patients who were identified as current tobacco users also varied by type of health insurance, with visits made by those with Medicaid/SCHIP (33.2%) and those who were self-payers (26.6%) more likely to be current tobacco users than those with private insurance (17.1%) or Medicare (12.5%). In addition, patients who were screened for tobacco use by their primary care physician were more likely to be current tobacco users (18.7% of visits) than patients who were screened by a physician who was not (16.2% of visits). Patients who visited certain physician specialists were more likely to be identified as current tobacco users (general or family practice, 21.9%, and psychiatry, 23.4%) than patients who visited other specialists, excluding specialists in internal medicine, cardiovascular diseases, and obstetrics/gynecology (15.5% of visits).

Among the patients who were classified as current tobacco users, 20.9% received tobacco counseling during their physician visit. Visits that included tobacco counseling varied by patient's age, with patients aged 45–64 years receiving a higher percentage of counseling (22.7%) than patients aged 25–44 years (17.9%). Among all outpatient visits for current smokers identified by screening, visits that included tobacco counseling also varied by type of health insurance; patients with private insurance (20.8%), Medicare (22.4%), Medicaid/SCHIP (22.8%), and self-payers (23.5%) were more likely to receive counseling than patients who had workers' compensation, were classified as no charge or charity, were classified under other sources of payment (i.e., other than private insurance, Medicare, Medicaid/SCHIP, workers' compensation, self-pay, and no charge or charity), or whose insurance status was unknown (12.5%). Visits that included tobacco counseling also varied by whether the physician was the patient's primary care physician (26.9% of visits) or was not (15.5% of visits). Likewise, visits that included tobacco counseling varied by physician specialty; visits to internal medicine physicians (32.5%) and cardiovascular disease specialists (35.4%) were more likely to include counseling than visits to general or family practitioners (23.5% of visits) and obstetricians/gynecologists (19.7% of visits). Outpatient visits of ≥20 minutes were more likely to include counseling (23.6%) than those of <20 minutes (18.6%).

Among the patients who were identified as current tobacco users, 7.6% received a prescription or an order for a medication associated with tobacco cessation. An order for a cessation medication varied by health insurance, with patients who had private insurance more likely to receive a prescription or order for cessation medication (9.7%) than patients with Medicare (5.5%). An order for a cessation medication also varied by physician specialty; psychiatrists were more likely to include an order for a cessation medication (17.7%) than other specialists. (Psychiatrists had a higher proportion [95.2%] of orders for bupropion, which can be used both as an antidepressant and as a tobacco cessation medication, than all specialists [57.7%]). Of visits with a medication order, 95.4% of the visits had an order for one cessation medication, and 4.6% had an order for more than one cessation medication. Among patients who were identified as current tobacco users and received a prescription or order for a cessation medication, 97.3% of the medications were for prescription drugs (bupropion, 57.7%; varenicline, 38.7%; and nicotine nasal spray and inhaler, 0.9%).

The prevalence of recent smoking cessation success increased significantly from 2005 to 2009 ($p<0.05$) among adult smokers aged ≥18 years overall and among those who visited a physician in the past year (Figure). No trend in recent smoking cessation success was observed among those who did not visit a physician in the past year. Overall, prevalence of recent smoking cessation success was 6.6% in 2009 (7.2% among those who visited a doctor in the past year and 3.9% among those who did not visit a doctor in the past year [$p<0.001$ by t-test]).

FIGURE. Percentage of adult smokers* aged ≥18 years who recently quit smoking, by whether persons visited a physician in the past year — National Health Interview Survey, United States, 2005–2009



* Number of adults who ever smoked 100 cigarettes, do not smoke now, and last smoked 6 months to 1 year ago. The denominator included number of adults aged ≥18 years who have ever smoked 100 cigarettes, do not smoke now, and last smoked ≤1 year ago and current smokers who initiated smoking at least 2 years ago.

† Age adjusted to the 2000 U.S. census population.

Discussion

This report indicates that although tobacco use screening occurred during the majority of adult visits to outpatient physician offices during 2005–2008 (62.7%), among patients who were identified as current tobacco users, only 20.9% received tobacco cessation counseling and 7.6% received tobacco cessation medication. The 2008 update to the PHS *Clinical Practice Guideline for Treating Tobacco Use and Dependence* concluded that to increase tobacco cessation rates, it is essential for clinicians and the health-care delivery system to consistently identify and document tobacco use status and treat every tobacco user with cessation counseling and any of the seven FDA-approved first-line medications (except when medically contraindicated or with specific populations for which evidence of effectiveness is insufficient, such as pregnant women, smokeless tobacco users, light smokers, and adolescents). The *Healthy People 2020* objectives for health systems changes related to tobacco use include goals for increasing both tobacco screening and tobacco counseling among tobacco users in office-based ambulatory care settings (objectives TU-9.1 and TU-10.1).

The demographics of patients who were classified as current users of tobacco were similar to those among all U.S. adults who use tobacco (*2*). The findings in this report indicate that screening for tobacco use was lower among Hispanic patients than among non-Hispanic whites, a finding that is similar to findings from another study using 2001–2005 NAMCS data; in that study, lack of insurance did not explain the ethnic differences (*6*). Possible explanations for the lower prevalence of tobacco screening among Hispanic patients might include cultural and language differences between the patients and physicians, factors that have been identified as barriers to cancer screening (*7*). Medical school curricula should include training to address these barriers to preventive services for Hispanic patients as well as other patient populations whose members are underrepresented among physicians (*8,9*).

Tobacco counseling among adults aged 25–44 years was less prevalent than among older patients. This finding is notable because younger smokers are more likely than older smokers to have tried to quit in the past year and are less likely to succeed in quitting (*10*). Successful quit attempts begin to occur, on average, at age 40 years, and the percentage of former smokers among those who ever smoked ≥100 cigarettes (an indicator of successful cessation) also increases with age (*10*). Some physicians might believe that younger patients are not seriously interested in quitting (*10*). However, tobacco information also should be provided to patients who seem unwilling to quit as a way to encourage them to think about quitting (*4*). Although tobacco cessation is beneficial at any age, intervening as early as possible is important because quitting at age 50 decreases by half the smoking-related health effects, and quitting at age 30 prevents almost all of the effects to the level of a never smoker (*11,12*).

During 2005–2008, patients who were current users of tobacco who had an unknown health insurance status or other selected types of health insurance (workers' compensation, no charge or charity, or other sources of payment not covered by private insurance, Medicare, Medicaid/SCHIP, workers' compensation, self-pay, and no charge or charity) were less likely to be screened for tobacco use (all visits) or receive counseling than self-pay patients and those with all other types of insurance (i.e., private insurance, Medicaid, and Medicare/SCHIP). The PHS guideline concluded that persons who have insurance that covers treatment for tobacco use are more likely to receive treatment than those who do not (*4*). Tobacco dependence treatments (both counseling and medication), whether provided as paid or covered benefits by health insurance plans, have been shown to increase the proportion of smokers who use cessation treatment, attempt to quit, and successfully quit (*4*). Neither private insurers nor state Medicaid programs consistently provide comprehensive coverage of evidence-based

tobacco interventions (*4*). For example, in 2009, although 47 (92%) of 51 Medicaid programs offered coverage for some form of tobacco-dependence treatment to some Medicaid enrollees, only five states offered coverage of all recommended pharmacotherapies and individual and group counseling for all Medicaid enrollees (*13*). A *Healthy People 2020* objective (TU-8) is to increase Medicaid insurance coverage of all evidence-based treatments for nicotine dependency to all 50 states and the District of Columbia (*5*).

The Patient Protection and Affordable Care Act of 2010 as amended by the Healthcare and Education Reconciliation Act of 2010 (referred to collectively as the Affordable Care Act [ACA]) and other national initiatives will increase tobacco cessation treatment coverage (*14*). As of October 1, 2010, as part of the Affordable Care Act (ACA §4107), state Medicaid programs were required to provide tobacco cessation coverage to pregnant women enrollees with no cost sharing. Effective January 1, 2013, state Medicaid programs that cover prevention services recommended as grade A or B by the U.S. Preventive Services Task Force with no cost sharing will receive an enhanced federal matching rate (ACA §4106); evidence-based smoking cessation services are grade A recommendations (*14,15*). Effective January 1, 2014, the Affordable Care Act will also bar state Medicaid programs from excluding FDA-approved cessation medications, including OTC medications, from Medicaid drug coverage (ACA §2502). As of July 2011, Medicaid began allowing states to apply for 50% administrative match funds for telephone quitline services provided to Medicaid enrollees. Also as a part of the Affordable Care Act (ACA §1001), as of January 1, 2014, newly qualified health insurance plans operating in the exchanges* are required to offer their members cessation coverage without cost sharing (*16*). This requirement also applies to grandfathered plans that were in existence before that date if they undergo substantial changes (*17*). As of August 25, 2010, Medicare began offering cessation counseling as a covered benefit to all its members; previously, only Medicare enrollees who had already developed tobacco-related disease were eligible for counseling. Effective January 1, 2011, the Affordable Care Act (ACA §4104) also ended Medicare coinsurance requirements for any covered preventive service that is recommended with a grade of A or B by the U.S. Preventive Services Task Force, including cessation services (*14*). In addition, as of January 1, 2011, all federal employees began receiving comprehensive cessation coverage through the Office of Personnel Management and the Federal Employees Health Benefit Program. (Additional information on this benefit is available at http://www.opm.gov/quitsmoking.) This new benefit can serve as model for comprehensive tobacco cessation coverage for state and private insurers. Given the decrease in smoking prevalence that occurred after implementation of mandated tobacco cessation coverage for the Massachusetts Medicaid program (*18*), expanded access to tobacco cessation services and treatments are likely to reduce the prevalence of current smoking among U.S. adults and the related adverse effects.

Other substantial barriers interfere with clinician assessment and treatment of smokers, including lack of knowledge, lack of time, inadequate payment for treatment, and lack of institutional support for routine assessment and treatment of tobacco use (*4*). The findings in this report indicate that both physician and visit characteristics were related to the likelihood of screening and counseling for tobacco use occurring during a visit. Patients visiting their primary care physician had a higher likelihood of receiving tobacco use screening and cessation counseling than patients who visited a physician who was not their primary care physician, perhaps because the primary care physicians were providing more routine care than specialized care, and tobacco cessation counseling might have been provided as part of a wellness or preventive care visit. In addition, primary care physicians might have had a more established relationship with their patients and felt more comfortable addressing tobacco use than other physicians. General and family practitioners and obstetricians/gynecologists were more likely to screen for tobacco use during patient visits than physicians in other specialties; however, they were less likely to provide tobacco counseling than internal medicine physicians and cardiologists. These differences might be related to the reasons patients visit cardiologists and internal medicine physicians; they might be more willing to make a quit attempt as a result of an acute medical event or a smoking-related health problem (*4*). More research is needed to identify factors that affect the provision of tobacco screening and counseling in various medical specialties, particularly among obstetricians/gynecologists because of the substantial effects of tobacco on reproductive health, as well as the associated costs (*19,20*).

The frequency of tobacco counseling was higher among physicians who spent ≥20 minutes with a patient. Lack of time has been noted as a barrier to clinical interventions, and total treatment time is an important determinant of tobacco cessation success. Although clinicians can increase quit rates among patients with even minimal interventions (<3 minutes), the effectiveness of counseling increases with the intensity of the intervention (i.e., session length) up to a total contact

*Beginning in 2014, a competitive insurance marketplace will be set up in the form of state-based insurance exchanges. These exchanges will allow eligible persons and small businesses with up to 100 employees to purchase health insurance plans that meet criteria outlined in the Affordable Care Act (ACA §1311). If a state does not create an exchange, the federal government will run one in that state.

time (which might span multiple visits) of 90 minutes (*4*). Health-care systems can support physician interventions by instituting effective systems-level changes that make screening and brief cessation intervention a standard part of every office visit. According to the *Guide to Community Preventive Services* (*21*), provider-reminder systems increase health-care providers' assessment and treatment of tobacco use in a range of clinical settings and populations. Provider reminder systems remind or prompt providers to screen and treat patients for tobacco use and can be implemented as chart stickers, vital sign stamps, medical record flow sheets, check lists, or as part of electronic medical records. The PHS guideline further recommends that health-care providers offer medication and counseling referrals such as quitlines for patients who are willing to make a quit attempt or offer additional treatment to help patients quit (*4*). Other patient characteristics, such as educational attainment and language preference, which were not included in NAMCS, might play a role in delivery of health-care services such as tobacco screening and counseling that could be examined in future studies.

The findings in this report are subject to at least five limitations. First, tobacco counseling might have included any information on tobacco or exposure to secondhand tobacco smoke as well as referrals to tobacco cessation programs. Because most adult established smokers (>80%) begin smoking before age 18 years (*22*), the assumption that most information provided to adults focused on cessation is reasonable. However, separately assessing both the provision of actual tobacco cessation counseling (i.e., problem solving and patient skills training) and referrals to smoking cessation programs would have enabled tracking the use of the of 5 A's more effectively (*4*). The lack of documentation might be a particular problem in the provision of advice to use OTC medications. Among visits by tobacco users during which a cessation medication was provided, the majority were prescription medications (97.3%). In contrast, OTC medications were the most commonly used cessation therapy that was effective among U.S. adults smokers who made a serious attempt to quit in the past year in 2005 (*23*). This difference might have resulted from a lack of advice to use OTC medications or lack of documentation of this advice. Some medications that were recommended by the physician might not have been documented. Therefore, OTC medications might be underreported. Second, data collection was limited to entry of eight medications. However, this did not seem to be a barrier to listing all the cessation medications a patient was offered among those who were identified as current tobacco users; tobacco users had, on average, 2.5 medications listed during each visit. Third, because bupropion can be prescribed as an antidepressant, whether a prescription for bupropion was for tobacco cessation or a mental illness is unclear. Bupropion accounted for a larger proportion of the cessation medications among psychiatrists (95.2%) than among all physicians (57.7%); therefore, it is more likely these prescriptions were to treat mental illness rather than tobacco use. Fourth, this analysis might be limited because quality and completeness of reporting varied over time, and changes in recommended tobacco cessation medications changed; for example, varenicline was approved first by FDA in May 2006. In addition, the differences from year to year in the quality of reporting and persons who completed the form might have resulted in differences in the percentage of patients screened for tobacco use. For example, using 2001–2004 NAMCS data, a previous study (*24*) reported that outpatient screening for tobacco use is 68.2%, higher than the 62.7% in this report. These findings might underestimate or overestimate the prevalence of tobacco screening, cessation counseling, and successful quit rates. Additional research is needed to understand differences in reporting over time. Finally, NAMCS data are primarily obtained through self-reporting by physicians and include no record validation.

Conclusion

Tobacco use screening and intervention is one of the most effective clinical preventive services, both in terms of cost and success (*4,25*), and is an important component of a comprehensive strategy for increasing tobacco use cessation. As part of its National Tobacco Control Program, CDC recommends that states implement policies and other effective community-based strategies that increase tobacco cessation, in addition to working with health-care systems, insurers, and purchasers of health insurance to expand coverage for tobacco cessation and implement health system changes that support these effective clinical interventions (*12,21*). Other effective community-based interventions for increasing cessation include increasing the unit price of tobacco products, conducting mass media campaigns combined with other community interventions, providing telephone counseling, and implementing smoke-free legislation (*12,21*). These interventions are critical for decreasing tobacco use among adults because most persons who try to quit typically do not use any effective services (*18,26*). Therefore, public health programs should implement a comprehensive tobacco cessation strategy by using policy and media interventions to promote cessation among tobacco users while simultaneously providing affordable, available, and effective services (including counseling and medication) to those who want help to quit (*12,21,27*).

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Breast Cancer Screening Among Adult Women — Behavioral Risk Factor Surveillance System, United States, 2010

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Introduction

Breast cancer continues to have a substantial impact on the health of women in the United States. It is the most commonly diagnosed cancer (excluding skin cancers) among women, with more than 210,000 new cases diagnosed in 2008 (the most recent year for which data are available) (*1*). Incidence rates are highest among white women at 122.6 per 100,000, followed by blacks at 118 per 100,000, Hispanics at 92.8, Asian/Pacific Islanders at 87.9, and American Indian/Alaskan Natives at 65.6 (*1*). Although deaths from breast cancer have been declining in recent years (2,3), it has remained the second leading cause of cancer deaths for women since the late 1980s with >40,000 deaths reported in 2008 (*1*). Although white women are more likely to receive a diagnosis of breast cancer, black women are more likely to die from breast cancer than women of any other racial/ethnic group (*1*). In addition, studies have demonstrated that nonwhite minority women tend to have a more advanced stage of disease at the time of diagnosis (*4,5*). Breast cancer also occurs more often among women aged ≥50 years, those with first-degree family members with breast cancer, and those who have certain genetic mutations (*4,5*). Understanding who is at risk for breast cancer helps inform guidelines for who should get screened for breast cancer.

In 2002, the U.S. Preventive Services Task Force (USPSTF) recommended screening mammography, with or without a clinical breast exam, every 1–2 years for women aged ≥40 years (*6*). Mammography has been demonstrated to reduce breast cancer mortality by detecting breast cancer early, when treatment is most effective (*7,8*). Mammography use increased in the 1990s, when it became a widely accepted practice for decreasing breast cancer mortality, but its use decreased during 2000–2005 (*9,10*). Studies that assessed this decline noted that women with insurance and higher annual incomes had the highest decrease in mammography use. In a follow up study, the overall prevalence of receiving mammography within the past 2 years rose slightly in 2006 to approximately the 2000 level (*11*). The latest report using 2008 data indicated that mammography use among women aged 50–74 years has essentially leveled off since 2000 (*12*). During 2000– 2006, although non-Hispanic white women and those with insurance had a substantial overall decline in mammography use, women who were uninsured, those who had lower annual income or education levels, and members of certain minority racial/ethnic groups persistently reported lower prevalence of mammography use (*11,12*). Moreover, substantial geographic variation in screening rates exists across the United States (*13*).

In November 2009, USPSTF changed its breast cancer screening recommendations to biennial mammography for women aged 50–74 years and stated that women aged 40–49 years do not need to be screened routinely (*6*). However, the Patient Protection and Affordable Care Act of 2010 (as amended by the Healthcare and Education Reconciliation Act of 2010 and referred to collectively as the Affordable Care Act [ACA]) specifically designates coverage of the breast cancer screening according to the recommendations issued before November 2009 (ACA §2713) (*14*).

This report summarizes the 2010 national mammography use prevalence estimates for women aged ≥40 years, by demographic characteristics and state-level prevalence estimates, based on the 2002 USPSTF recommendations. This information can be used by providers, public health practitioners, and other stakeholders as baseline data for assessing progress and gaps in breast cancer screening as the Affordable Care Act is implemented.

Methods

To estimate the prevalence of breast cancer screening using mammography among women aged ≥40 years in the United States, CDC analyzed 2010 data from the Behavioral Risk Factor Surveillance System (BRFSS). BRFSS is an ongoing, state-based, random-digit–dialed telephone survey of the civilian, noninstitutionalized adult population aged ≥18 years. The survey gathers information on health behaviors, chronic

diseases, and preventive health practices from all 50 states, the District of Columbia (DC), Guam, Puerto Rico, and the U.S. Virgin Islands. In every even year, the survey contains a women's health module that includes two questions related to mammography use. Participants are asked whether they have ever had a mammogram, and those who respond affirmatively are asked how long it has been since their last mammogram. Missing, refused, and "don't know" responses were excluded from analyses. In 2010, among the 276,995 female survey participants, 228,871 were aged ≥40 years and were asked the questions regarding mammography use, accounting for a total sample of 221,241 participants included in this analysis.

All data were weighted to the respondents' probability of selection, and sex, age, and race/ethnicity for each state's population using intercensal estimates. Percentages were age-adjusted to the BRFSS female population aged ≥40 years. Percentages and 95% confidence intervals were calculated using SAS (SAS Institute Inc., Cary, North Carolina) and SUDAAN (Research Triangle Institute, Research Triangle Park, North Carolina) software. The median response rate for the Council of American Survey and Research Organizations (CASRO) was 54.6% (range: 39.1%–68.8%) and the CASRO cooperation rate was 76.9% (range: 56.8%–86.1%).* Current use of mammography was defined as having a mammogram within the past 2 years.

Results

In 2010, an estimated 75.4% women aged ≥40 years and 79.7% of women aged 50–74 years reported having a mammogram within the past 2 years (Table 1). Women who reported the highest prevalence of mammography use were those aged 60–69 years (81.3%) and 70–74 years (82.4%), non-Hispanic blacks (78.6%), those with college graduate or higher level of education (80.8%), those whose annual household income was ≥$75,000 (83.8%), those with health insurance (78.6%), and those with a usual source of health care (78.3%). Women who reported the lowest prevalence of mammography use were those aged 40–49 years (68.8%), American Indian/Alaska Natives (63.9%), those who did not graduate from high school (65.9%), those whose annual household income was ≤$15,000 (63.2%), those with no health insurance (50.4%), and those with no usual source of health care (43.6%).

TABLE 1. Number and percentage* of U.S. adult women aged ≥40 years who reported having a mammogram within the past 2 years, by demographic characteristics — Behavioral Risk Factor Surveillance System, United States, 2010

Characteristic	No.	%	(95% CI)
Total	**221,241**	**75.4**	**(75.0–75.7)**
Age (yrs)			
40–49	41,398	68.8	(68.0–69.6)
50–74	136,278	79.7	(79.3–80.1)
>75	43,565	73.0	(72.3–73.7)
Race/Ethnicity			
White, non-Hispanic	179,827	75.4	(75.0–75.7)
Black, non-Hispanic	17,852	78.6	(77.5–79.7)
Hispanic	11,199	75.4	(74.0–76.8)
Asian/Pacific Islander	3,127	73.7	(70.8–76.5)
American Indian/Alaska Native	2,514	63.9	(59.4–68.1)
Other	4,267	67.0	(64.4–69.4)
Education level			
Less than high school graduate	20,998	65.9	(64.5–67.3)
High school graduate	70,164	71.8	(71.1–72.5)
Some college	61,468	75.2	(74.5–75.8)
College graduate or higher	68,247	80.8	(80.3–81.3)
Annual household income			
<$15,000	25,914	63.2	(61.9–64.4)
$15,000–34,999	61,435	68.1	(67.3–68.9)
$35,000–49,999	28,093	74.7	(73.7–75.7)
$50,000–74,999	27,640	79.2	(78.3–80.0)
≥$75,000	42,749	83.8	(83.2–84.4)
Health insurance coverage			
Yes	202,529	78.6	(78.2–78.9)
No	18,351	50.4	(48.7–52.0)
Usual source of health care			
Yes	203,719	78.3	(78.0–78.7)
No	17,047	43.6	(42.3–45.0)

Abbreviation: CI = confidence interval.
* Age-adjusted to the 2010 BRFSS female population.

The age-adjusted prevalence of reported mammography use within the study period (i.e., past 2 years from the time of the 2010 BRFSS interview) varied among the states, ranging from 63.7% in Idaho to 84.2% in Massachusetts (Table 2). Although mammography use prevalence varies considerably across the United States, the majority of states with the highest prevalence are located in the northeast region. Many states with the lowest prevalence estimates have more rural, less populated areas.

Discussion

In 2010, approximately 25% of women aged ≥40 years were not current with their mammography use according to the 2002 USPSTF guidelines. Mammography use was lower among American Indian/Alaska Native women, women with lower levels of education and annual household income, and

* The CASRO response rate is the product of three other rates: 1) the resolution rate, which is the proportion of telephone numbers that can be identified as either for a business or residence; 2)the screening rate, which is the proportion of qualified households that complete the screening process; and 3) the cooperation rate, which is the proportion of contacted eligible households for which a completed interview is obtained. CASRO response and cooperation rates reported by different surveys are not strictly comparable because of differences in how disposition catagories are defined.

TABLE 2. Number and percentage* of U.S. adult women aged ≥40 years who reported having a mammogram within the past 2 years, by state — Behavioral Risk Factor Surveillance System, United States, 2010

State	No.	%	(95% CI)
Quartile 1 (63.7%–70.9%)			
Idaho	3,333	63.7	(61.5–65.8)
Nevada	1,788	66.9	(63.4–70.1)
Wyoming	2,888	66.9	(64.8–68.9)
Montana	3,502	67.0	(64.9–69.1)
Oklahoma	3,969	67.2	(65.4–68.9)
Utah	4,209	67.2	(65.5–69.0)
Mississippi	4,506	67.9	(66.1–69.8)
Arkansas	2,095	68.2	(65.4–70.8)
Kentucky	4,491	69.8	(67.6–72.0)
New Mexico	3,454	70.3	(68.2–72.3)
Colorado	5,366	70.4	(68.9–71.9)
Texas	9,024	70.5	(68.8–72.1)
Oregon	2,560	70.8	(68.6–72.9)
Quartile 2 (71.0%–74.8%)			
Missouri	2,752	71.2	(68.6–73.6)
Indiana	5,105	71.2	(69.5–72.9)
Illinois	2,648	71.7	(69.4–73.8)
Nebraska	8,395	71.7	(69.9–73.3)
West Virginia	2,235	71.9	(69.9–74.1)
Alaska	765	72.8	(68.3–77.0)
Ohio	5,019	73.9	(72.3–75.5)
Pennsylvania	5,649	74.2	(72.6–75.7)
South Carolina	4,836	74.2	(72.1–76.1)
Arizona	2,999	74.2	(71.4–76.9)
Washington	9,796	74.4	(73.2–75.5)
Alabama	4,188	74.8	(72.9–76.7)
North Dakota	2,302	74.8	(72.7–76.8)
Quartile 3 (74.9%–77.8%)			
Kansas	4,287	75.8	(74.2–77.2)
Tennessee	3,252	75.9	(73.7–77.9)
Iowa	3,051	76.1	(74.2–77.9)
Louisiana	3,805	76.2	(74.5–77.7)
Hawaii	3,123	76.4	(74.3–78.4)
South Dakota	3,313	76.6	(74.6–78.4)
Florida	18,023	77.0	(75.5–78.4)
North Carolina	6,076	77.2	(75.6–78.6)
New Jersey	5,884	77.4	(75.9–78.8)
Virginia	2,607	77.7	(75.3–80.0)
Vermont	3,392	77.8	(76.1–79.3)
Georgia	2,907	77.8	(75.8–79.7)
New York	4,399	77.8	(76.3–79.3)
Quartile 4 (77.9%–84.2%)			
Michigan	4,599	78.2	(76.6–79.7)
California	7,767	78.4	(77.3–79.5)
Wisconsin	2,275	78.6	(76.3–80.7)
Maine	4,159	80.2	(78.6–81.6)
District of Columbia	1,814	80.3	(77.9–82.5)
New Hampshire	3,112	80.5	(78.7–82.1)
Minnesota	4,326	80.5	(78.8–82.2)
Maryland	4,522	80.8	(79.2–82.2)
Delaware	2,180	81.2	(79.0–83.2)
Connecticut	3,375	81.5	(79.7–83.2)
Rhode Island	3,441	81.5	(79.8–83.0)
Massachusetts	7,678	84.2	(82.9–85.4)
United States	221,241	75.4	(75.0–75.7)

Abbreviation: CI = confidence interval.
* Age-adjusted to the 2010 BRFSS female population.

women with no health insurance or usual source of health care. The geographic variation noted in mammography use ranged from 63.7% to 84.2%. Mammography use has not substantially changed since 2000 (76.5% [95% confidence interval (CI): 75.9–77.0]), consistent with previous reports examining 2006 (*11*) and 2008 (*12*) data. The geographic variation noted in these findings is similar to that noted in the 2000 and 2006 data (*13*). Multiple factors account for this variation, including the availability of large university hospital systems, geographic density of healthcare providers, level of insurance coverage in the population, accessibility to mammography facilities, and levels of annual income. The finding that women without health insurance or a usual source of health care have lower mammography use supports previous reports that a physician's recommendation for mammography is the most important influence for a woman to obtain a mammogram (*15*). Persistent lower mammography use among certain minority populations will continue to result in patients receiving a diagnosis of breast cancer at later stages and a potentially slower decrease in breast cancer death rates. One study addressing preventable deaths in the United States has estimated that a 5% increase in mammography use could prevent 560 deaths from breast cancer each year (*16*). Therefore, increasing mammography use among women, especially those with low use prevalence, might decrease breast cancer mortality substantially . More research is needed to help understand why these disparities exist and provide appropriate interventions that reduce or eliminate them.

To help address disparities in mammography use, CDC administers the National Breast and Cervical Cancer Early Detection Program (NBCCEDP) (*17*). NBCCEDP provides free or low-cost screening and diagnostic breast and cervical cancer services to low-income, under- and uninsured women and provides access to state Medicaid programs for treatment if breast or cervical cancer are diagnosed. NBCCEDP has reduced mortality among the medically uninsured (*18*) and prevented 0.6 deaths for every 1,000 women screened (*19*).

As a result of provisions in the Affordable Care Act, Medicare now covers adult clinical preventive services graded A (strongly recommended) or B (recommended) by the USPSTF and immunizations recommended by the Advisory Committee on Immunization Practices with no cost sharing to beneficiaries (ACA §2713). Starting in 2014, these services, along with recommended preventive services for children, youth, and women, will be covered at no cost sharing by newly qualified private health plans operating in the state-based insurance

exchanges.[†] Beginning in 2013, state Medicaid programs that eliminate cost sharing for these clinical preventive services may receive enhanced federal matching funds for them (ACA §4106).

The Affordable Care Act focuses on reducing health disparities by removing barriers to preventive health screening such as reducing out-of-pocket costs and expanding access to care by increasing availability of health-care providers and services through provisions such as the essential health benefits package (ACA §1302), state health-care workforce development grants (ACA §5102), and public health workforce recruitment and retention programs (ACA §5204). Implementation of the Affordable Care Act is expected to result in an increase in mammography use among many more women of appropriate screening age and in a decrease in disparities among underserved populations by vastly expanding insurance coverage among the uninsured population. Using evidence-based interventions to increase breast cancer screening by addressing other barriers to screening, as recommended by the *Guide to Community Preventive Services,* might further decrease breast cancer mortality nationwide (*20,21*). These evidence-based interventions target both clients and providers. Client-oriented interventions (e.g., client reminders, small media, group education, one-on-one education, reducing structural barriers, and reducing out-of-pocket costs) are directed toward educating clients and removing barriers that interfere with screening (*20*). Provider-oriented interventions (e.g., recall and reminder systems or assessment and feedback systems) are designed to increase knowledge and develop system-level approaches to increase provider recommendation and delivery of cancer screening services (*21*).

The findings provided in this report are subject to at least three limitations. First, the data are self-reported and not validated from medical or billing records. Studies have demonstrated that women often over-report having a recent mammogram. For example, a recent report indicated that black women tend to over-report twice as often as white women (*22*). Adjusting for this over-reporting resulted in a considerable decrease in reported mammography use of 29 percentage points among black women compared with 12 percentage points among white women (*22*). Second, because the BRFSS survey questionnaire does not ask why a woman had a mammogram, whether the mammogram was for screening or diagnostic purposes can not be determined. Finally, because BRFSS samples civilian, noninstitutionalized persons by telephone, and only those with landlines are represented in this sample, these data might not be nationally representative.

[†] Beginning in 2014, a competitive insurance marketplace will be set up in the form of state-based insurance exchanges. These exchanges will allow eligible persons and small businesses with up to 100 employees to purchase health insurance plans that meet criteria outlined in the Affordable Care Act (ACA §1311). If a state does not create an exchange, the federal government will operate it.

Conclusion

Reducing personal costs and expanding insurance coverage are important factors that will help to ensure that more women receive mammography screening (*20*). Developing new and effective interventions to increase mammography use relies upon better understanding of who is not receiving recommended breast cancer screening and the reasons for lack of screening. Although clear communication for individualized decision-making is difficult, helping women to understand their personal risk (e.g., family history of breast cancer, menstrual history, use of estrogen, and genetic abnormalities) is also important for changing a woman's behavior and acceptance of the need to undergo screening (*23–25*).

Public health efforts to monitor the use of clinical preventive services such as mammography screening will be necessary as the Affordable Care Act is fully implemented over the next few years. Understanding the interaction between individual, community-level, and federal-level activities will help identify promising practices and unsuccessful efforts that require modification. In particular, close monitoring of mammography screening will help to identify potential concerns regarding low use of this early detection test, which could lead to negative outcomes such as an increase in late stage breast cancer diagnoses and breast cancer mortality. The ACA includes the Prevention and Pubic Health Fund (ACA §4002) to increase the use of clinical preventive services at the community level. The establishment of additional interventions such as cancer screening registries to monitor outcomes of abnormal screening results, patient navigation services (i.e., assistance to help patients facilitate access to services and overcome barriers), and electronic health records could help ensure the U.S. population gets all the appropriate clinical preventive services.

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Prevalence of Colorectal Cancer Screening Among Adults — Behavioral Risk Factor Surveillance System, United States, 2010

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Introduction

Among cancers that affect both men and women, colorectal cancer is the second leading cause of cancer death (*1*). In 2007 (the most recent year for which data are available), >142,000 persons received a diagnosis for colorectal cancer and >53,000 persons died (*1*). Screening for colorectal cancer has been demonstrated to be effective in reducing the incidence of and mortality from the disease (*2*). In 2008, the U.S. Preventive Services Task Force (USPSTF) recommended that persons aged 50–75 years at average risk for colorectal cancer be screened by using one or more of the following methods: high-sensitivity fecal occult blood testing (FOBT) every year, sigmoidoscopy every 5 years with FOBT every 3 years, or colonoscopy every 10 years (*2*).

The effectiveness of screening in reducing the incidence and mortality of colorectal cancer has been well established (*2*). Colorectal cancer screening has been identified as a high-impact, cost-effective service (*3,4*). An estimated 10,000 additional deaths could be prevented each year if all adults aged ≥50 years were offered colorectal cancer screening, at an estimated cost of $11,900 per life year saved (*3*). Modeling studies have suggested that increasing colorectal cancer screening would have the greatest impact in reducing colorectal cancer mortality, compared with reducing risk factors or increasing treatment use (*5,6*). Despite strong evidence of its effectiveness, colorectal cancer screening prevalence continues to lag behind that of other screening-amenable cancers (i.e., breast and cervical cancer) (*7,8*).

This report summarizes the prevalence of colorectal cancer screening test use that can be used as a baseline by providers, public health practitioners, and other stakeholders to assess progress in colorectal cancer screening rates as the Patient Protection and Affordable Care Act (ACA) of 2010 (as amended by the Healthcare and Education Reconciliation Act of 2010 and referred to collectively as the Affordable Care Act [ACA]) is fully implemented (*9*).

Methods

To determine the state-based prevalence of colorectal cancer screening among U.S. adults, CDC analyzed 2010 data from the Behavioral Risk Factor Surveillance System (BRFSS). BRFSS is an ongoing, state–based, random-digit–dialed telephone survey of the U.S. civilian, noninstitutionalized adult population aged ≥18 years that collects information on health risk behaviors, preventive health practices, and health-care access in the United States, the District of Columbia (DC), Guam, Puerto Rico, and the U.S. Virgin Islands. Every 2 years (in even-numbered years) respondents aged ≥50 years are asked whether they have ever used a "special kit at home to determine whether the stool contains blood (FOBT)," whether they have ever had "a tube inserted into the rectum to view the colon for signs of cancer or other health problems (sigmoidoscopy or colonoscopy)," and when these tests were last performed. Starting in 2008, respondents also were asked whether their most recent test had been a sigmoidoscopy or a colonoscopy. Percentages were estimated for persons who reported receiving an FOBT within 1 year, or sigmoidoscopy within 5 years with FOBT within 3 years, or colonoscopy within 10 years preceding the survey. Based on the USPSTF recommended screening age, the analysis was restricted to persons aged 50–75 years.

Survey data were available for all 50 states and DC. Based on Council of American Survey and Research Organizations (CASRO) guidelines,* in 2010, the median response rate was 54.6% (range: 39.1%–68.8%), and the median cooperation rate was 76.9% (range: 56.8%–86.1%). Respondents who refused to answer, had a missing answer, or did not know the answer to a question were excluded from analysis of that

*The CASRO response rate is the product of three other rates: 1) the resolution rate, which is the proportion of telephone numbers that can be identified as either for a business or residence; 2)the screening rate, which is the proportion of qualified households that complete the screening process; and 3) the cooperation rate, which is the proportion of contacted eligible households for which a completed interview is obtained. CASRO response and cooperation rates reported by different surveys are not strictly comparable because of differences in how disposition catagories are defined.

specific question. Of 236,186 persons aged 50–75 years who responded, approximately 12,206 (5.2%) were excluded from the results, yielding a final sample of 223,980. Data were weighted to the age, sex, and racial/ethnic distribution of each state's adult population using intercensal estimates and were age-standardized to the 2010 BRFSS population.

Results

In 2010, an estimated 64.5% of respondents aged 50–75 years reported having had one of the following colorectal screening tests recommended by USPSTF: FOBT within 1 year, sigmoidoscopy within 5 years with FOBT within 3 years, or colonoscopy within 10 years preceding the survey (Table 1). The proportion of respondents who reported having had a colorectal cancer test within the recommended interval increased with age, increasing education level, and increasing annual household income. The proportion was also greater for those with health insurance than for those without, those with a regular care provider than those without, and slightly greater for women than for men. A slightly greater proportion of whites reported being up-to-date with colorectal cancer testing compared with all other racial/ethnic groups.

The proportion of respondents who had colonoscopy as their most recent test (60.3%) was much greater than the proportion that had FOBT (11.7%) or sigmoidoscopy in combination with FOBT (1.3%) as their most recent test. The proportion reporting use of any of the three test options increased with age and was greater among those with insurance and those with a regular care provider. Although a very small proportion of respondents reported having had a sigmoidoscopy within 5 years with FOBT within 3 years, a slightly greater proportion reported having had a sigmoidoscopy alone within 5 years (5.7% [95% confidence interval (CI) 5.4%–5.9%]; data not shown). A greater proportion of blacks reported receiving FOBT within 1 year compared with all other members of racial/ethnic groups; a greater proportion of whites reported colonoscopy within 10 years compared with all other racial/ethnic groups. Minimal variation was noted in reported FOBT use by education level and household income, whereas the proportion of respondents reporting colonoscopy within the past 10 years increased substantially with increasing education level and increasing annual household income.

The proportion of respondents who reported having received any colorectal cancer test within the recommended interval was highest in Massachusetts (75.2%) and in New Hampshire (75.1%) and lowest in Oklahoma (54.1%) (Table 2). Connecticut had the largest proportion of respondents who reported colonoscopy within 10 years (72.5%), and West Virginia had the smallest (49.7%). California had the largest proportion of respondents who reported FOBT within 1 year (19.4%), and Utah had the smallest (4.7%). All states had <5% of respondents reporting receiving sigmoidoscopy within 5 years and FOBT within 3 years.

Discussion

Approximately two thirds of the U.S. population aged 50–75 years was up-to-date with colorectal cancer screening according to USPSTF recommendations. As noted in previous reports, certain populations had a lower prevalence of colorectal cancer screening, including those with a lower socioeconomic status, lower education levels, Hispanics, and those without health insurance or a regular health care provider (*10–12*). These populations also had a lower prevalence of screening with colonoscopy, despite evidence that colonoscopy has rapidly become the predominant method of colorectal cancer screening in the United States (*8*). This might reflect variation in access to colonoscopy by traditionally underserved populations. Substantial variation existed by state in the proportion of respondents who were up-to-date with colorectal cancer screening. In general, states with the highest proportion of residents who were current with screening also had the highest proportion of residents who reported colonoscopy as their most recent test. Use of FOBT and sigmoidoscopy with FOBT was low in all states. Variation in colonoscopy use by state might result from variations in the level of insurance coverage, proportion of underserved populations in the state, and availability of endoscopists (*13,14*).

An understanding of what factors influence the use of colorectal cancer screening is necessary to make improvements. Lack of insurance has been cited frequently as a barrier to colorectal cancer screening (*12,15,16*). Multiple studies have noted significantly lower colorectal cancer screening prevalence among the uninsured (*10–12*). The cost of a screening colonoscopy can range between $400 and $1,600 (*17,18*). FOBT kits themselves are relatively inexpensive, but additional costs incurred by office visits and any potential follow up testing with colonoscopy could be cost prohibitive. Further, the uninsured might not have a regular health care provider from whom to receive a recommendation or referral for testing. Full implementation of the Affordable Care Act will potentially provide millions of currently uninsured persons with coverage of clinical preventive services graded A or B by the USPSTF, such as colorectal cancer screening (graded A for adults aged 50–75 years), without additional copays, thereby removing a substantial financial barrier. Colorectal cancer screening for those currently insured by Medicare also should increase, as the Affordable Care Act removed cost-sharing for USPSTF grade A

TABLE 1. Percentage of respondents aged 50–75 years who reported colorectal cancer test use, by test type and by selected characteristics — Behavioral Risk Factor Surveillance System, United States, 2010*

Characteristic	Up-to-date with CRC screening†		FOBT within 1 year		Sigmoidoscopy within 5 years with FOBT within 3 years		Colonoscopy within 10 years	
	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Overall	**64.5**	**(64.1–64.9)**	**11.7**	**(11.5–12.0)**	**1.3**	**(1.2–1.4)**	**60.3**	**(59.9–60.7)**
Age (yrs)								
50–59	55.1	(54.6–55.8)	9.1	(8.8–9.5)	0.9	(08–1.0)	51.0	(50.4–51.6)
60–69	72.9	(72.3–73.4)	14.0	(13.6–14.4)	1.6	(1.5–1.8)	68.5	(67.9–69.0)
70–75	76.9	(76.1–77.6)	15.4	(14.8–16.0)	2.1	(1.8–2.4)	72.8	(72.0–73.5)
Sex								
Men	63.9	(63.3–64.5)	12.4	(12.0–12.8)	1.4	(1.3–1.5)	59.5	(58.9–60.1)
Women	65.0	(64.6–65.5)	11.2	(10.9–11.5)	1.2	(1.1–1.3)	61.0	(60.5–61.5)
Race/Ethnicity								
White	66.3	(65.9–66.7)	11.3	(11.1–11.6)	1.3	(1.2–1.4)	62.5	(62.1–62.9)
Black	65.0	(63.8–66.3)	15.1	(14.2–16.2)	1.4	(1.1–1.8)	60.0	(58.7–61.3)
Hispanic	51.6	(49.7–53.4)	10.8	(9.8–11.9)	1.2	(0.9–1.7)	46.0	(44.1–47.8)
Asian/Pacific Islander	55.1	(51.8–58.4)	13.0	(10.9–15.3)	1.7	(0.9–2.9)	49.9	(46.6–53.2)
American Indian/Alaska Native	55.3	(51.4–59.2)	14.6	(12.0–17.7)	0.9	(0.4–1.8)	48.9	(45.1–52.8)
Other	61.3	(58.7–63.9)	13.5	(11.9–15.4)	2.2	(1.5–3.1)	55.2	(52.5–57.8)
Education level								
<High school	45.4	(44.0–46.9)	9.6	(8.8–10.5)	0.8	(0.6–1.1)	40.6	(39.2–42.0)
High school graduate/GED	59.5	(58.8–60.2)	11.1	(10.7–11.5)	0.9	(0.8–1.1)	55.1	(54.5–55.8)
Some college/tech school	65.6	(64.9–66.3)	12.3	(11.9–12.8)	1.4	(1.3–1.6)	61.2	(60.5–61.8)
College graduate	71.9	(71.3–72.5)	12.4	(12.1–12.9)	1.7	(1.5–1.9)	68.2	(67.6–68.9)
Annual household income								
<$15,000	47.6	(46.3–48.9)	11.2	(10.4–12.0)	0.9	(0.7–1.2)	42.2	(41.0–43.5)
$15,000–34,999	55.8	(55.0–56.5)	11.5	(11.1–12.0)	1.1	(1.0–1.3)	50.8	(50.0–51.5)
$35,000–49,999	64.6	(63.6–65.5)	11.9	(11.3–12.6)	1.5	(1.3–1.9)	60.2	(59.2–61.2)
$50,000–74,999	68.8	(68.0–69.7)	11.9	(11.4–12.5)	1.3	(1.1–1.6)	65.1	(64.2–66.0)
≥$75,000	73.8	(73.1–74.5)	12.3	(11.8–12.8)	1.7	(1.5–1.9)	70.4	(69.7–71.1)
Health insurance								
Yes	67.5	(67.2–67.9)	12.2	(11.9–12.4)	1.4	(1.3–1.5)	63.3	(62.9–63.7)
No	36.1	(34.3–38.0)	7.9	(6.9–9.1)	0.5	(0.3–0.7)	32.5	(30.7–34.3)
Regular care provider								
Yes	67.9	(67.5–68.3)	12.3	(12.1–12.6)	1.4	(1.3–1.5)	63.6	(63.2–64.0)
No	31.7	(30.5–33.0)	5.7	(5.1–6.3)	0.5	(0.3–0.7)	28.4	(27.2–29.6)

Abbreviations: CI = confidence interval; FOBT = fecal occult blood test; GED = general equivalency diploma.

* Data were weighted to the age, sex, and racial/ethnic distribution of each state's adult population using intercensal estimates and were age-standardized to the 2010 Behavioral Risk Factor Surveillance System (BRFSS) population.

† FOBT within 1 year, or sigmoidoscopy within 5 years with FOBT within 3 years, or colonoscopy within 10 years (United States Preventive Services Task Force, 2008).

or B services as well as Advisory Committee on Immunization Practices (ACIP)-recommended immunizations as of January 1, 2011 (ACA §2713). The law provides for an enhanced federal match rate to state Medicaid programs that offer these services at no cost sharing, beginning January 1, 2013 (ACA §4106) .

Although substantial gains in colorectal cancer screening rates have been made over the past 10 years (from 54% in 2002 to approximately 65% in 2010), for the full potential of screening to be reached, additional work is needed to increase the uptake of screening among the currently insured and soon-to-be insured (*10*). Access to a regular health-care provider and having health insurance were each associated with a substantially higher prevalence of colorectal cancer screening; however, the prevalence of colorectal cancer screening has remained lower than screening rates achieved with breast and cervical cancer screening, even among the currently insured (*7,8*). Participation in screening is influenced by multiple factors at the individual, physician, and organizational levels (*19*). Individual level barriers include lack of a physician recommendation, lack of knowledge, fear, embarrassment, lack of symptoms or current health problems, cost, and competing demands (*20,21*). Barriers also might vary by test type. Reported barriers to FOBT include not wanting to handle stool or keep stool cards in the house (*20,22*). Colonoscopy-specific barriers include fear or avoidance of bowel preparation, fear of having a tube inserted through the rectum, and fear of pain or discomfort (*20*). Providers also might preferentially recommend a particular test to patients, which might deter

TABLE 2. Percentage of respondents aged 50-75 years who reported colorectal test use, by test type and by state* — Behavioral Risk Factor Surveillance System, United States, 2010

State	Up-to-date with CRC screening†		FOBT within 1 year		Sigmoidoscopy within 5 years with FOBT within 3 years		Colonoscopy within 10 years	
	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
United States	**64.5**	**(64.1–64.9)**	**11.7**	**(11.5–12.0)**	**1.3**	**(1.2–1.4)**	**60.3**	**(59.9–60.7)**
Quartile 1								
Oklahoma	54.1	(52.3–56.0)	9.2	(8.3–10.3)	0.4	(0.2–0.7)	50.6	(48.7–52.4)
West Virginia	54.5	(52.1–56.8)	12.8	(11.3–14.4)	0.3	(0.1–0.7)	49.7	(47.4–52.0)
Idaho	55.9	(53.9–57.9)	8.1	(7.2–9.2)	0.8	(0.5–1.1)	52.4	(50.4–54.4)
Wyoming	56.7	(54.7–58.6)	8.3	(7.3–9.4)	0.5	(0.3–0.9)	53.2	(51.2–55.2)
Nevada	56.8	(53.4–60.1)	9.9	(8.1–12.1)	0.9	(0.5–1.7)	52.5	(49.1–55.9)
North Dakota	57.0	(54.8–59.2)	11.2	(9.9–12.6)	1.4	(1.0–2.0)	52.2	(50.0–54.5)
Mississippi	57.1	(55.1–59.0)	11.0	(9.9–12.2)	0.9	(0.5–1.6)	52.8	(50.8–54.7)
Montana	58.0	(56.0–60.0)	8.8	(7.8–10.0)	1.3	(0.8–2.0)	53.9	(51.9–55.9)
Alaska	58.3	(53.9–62.6)	8.0	(5.6–11.3)	0.2	(0.0–0.8)	57.0	(52.5–61.4)
Arkansas	58.6	(55.9–61.2)	10.2	(8.8–11.9)	0.1	(0.0–0.4)	54.2	(51.5–56.9)
Illinois	58.6	(56.1–61.1)	7.4	(6.2–8.7)	0.4	(0.2–0.9)	56.1	(53.6–58.6)
Texas	58.8	(56.7–60.7)	8.7	(7.8–9.8)	0.5	(0.3–0.7)	55.1	(53.1–57.1)
New Mexico	59.2	(57.2–61.1)	9.9	(8.7–11.2)	0.7	(0.5–1.0)	55.1	(53.1–57.1)
Quartile 2								
Nebraska	59.8	(58.0–61.5)	8.7	(7.8–9.7)	0.6	(0.4–1.0)	56.2	(54.4–58.0)
Louisiana	60.2	(58.3–62.0)	12.7	(11.4–14.1)	0.5	(0.3–0.9)	55.2	(53.3–57.1)
Hawaii	60.4	(58.1–62.6)	16.5	(14.8–18.2)	2.9	(2.3–3.8)	51.3	(49.0–53.6)
Tennessee	60.8	(58.3–63.2)	12.7	(11.2–14.4)	1.5	(1.0–2.4)	56.4	(53.9–58.9)
Indiana	61.2	(59.4–62.9)	10.0	(8.9–11.1)	0.9	(0.5–1.5)	57.5	(55.7–59.3)
Kentucky	61.8	(59.6–63.9)	8.6	(7.5–9.9)	0.4	(0.2–0.9)	59.4	(57.2–61.5)
California	62.2	(60.8–63.6)	19.4	(18.3–20.5)	4.4	(3.9–5.0)	52.7	(51.3–54.2)
Alabama	62.5	(60.4–64.6)	10.2	(9.0–11.5)	0.6	(0.4–0.9)	58.3	(56.2–60.4)
Ohio	62.8	(61.0–64.5)	11.8	(10.7–12.9)	1.2	(0.8–1.7)	58.1	(56.3–59.9)
Kansas	63.1	(61.4–64.7)	11.3	(10.4–12.4)	0.9	(0.6–1.3)	58.9	(57.2–60.5)
Missouri	63.2	(60.5–65.8)	8.4	(7.0–10.2)	0.8	(0.4–1.6)	59.9	(57.2–62.5)
Iowa	63.4	(61.4–65.3)	10.9	(9.7–12.2)	0.5	(0.3–0.9)	60.4	(58.4–62.4)
Quartile 3								
Oregon	63.6	(61.4–65.7)	11.4	(10.1–12.8)	3.6	(2.8–4.6)	57.8	(55.6–60.0)
Arizona	63.7	(60.7–66.6)	11.5	(9.9–13.3)	1.0	(0.6–1.8)	60.2	(57.1–63.1)
South Dakota	64.0	(61.9–66.0)	10.1	(8.9–11.4)	0.6	(0.4–1.1)	60.9	(58.8–63.0)
South Carolina	64.4	(62.3–66.5)	9.3	(8.1–10.6)	0.7	(0.4–1.2)	61.3	(59.1–63.5)
New Jersey	64.7	(62.3–66.4)	11.6	(10.5–12.9)	1.1	(0.7–1.7)	60.5	(58.8–62.3)
Colorado	65.2	(63.7–66.7)	12.0	(11.0–13.0)	1.6	(1.3–2.1)	59.6	(58.0–61.1)
Florida	66.0	(64.2–67.6)	13.6	(12.6–14.7)	0.8	(0.7–1.1)	61.6	(59.8–63.3)
Georgia	66.4	(64.2–68.5)	14.2	(12.7–15.8)	1.5	(1.0–2.2)	62.5	(60.3–64.7)
Pennsylvania	66.5	(64.8–68.1)	8.9	(8.0–9.9)	0.8	(0.5–1.2)	63.3	(61.5–65.0)
Virginia	67.0	(64.4–69.5)	12.6	(10.9–14.6)	1.5	(0.7–3.0)	63.1	(60.4–65.7)
Utah	67.3	(65.6–68.9)	4.7	(4.0–5.5)	0.4	(0.2–0.8)	65.9	(64.2–67.6)
Wisconsin	68.2	(65.7–70.5)	8.7	(7.4–10.1)	0.9	(0.5–1.6)	64.4	(61.9–66.8)
North Carolina	68.4	(66.7–70.1)	14.0	(12.8–15.3)	1.0	(0.8–1.3)	64.7	(63.0–66.5)
Quartile 4								
New York	69.2	(67.5–70.9)	9.8	(8.8–10.9)	0.7	(0.4–1.1)	66.7	(65.0–68.4)
Michigan	69.2	(67.6–70.8)	11.5	(10.5–12.6	1.2	(0.8–1.6)	65.7	(64.0–67.3)
Minnesota	69.6	(67.6–71.6)	6.4	(5.4–7.4)	1.4	(0.9–2.0)	67.8	(65.8–69.8)
Delaware	70.4	(67.9–72.8)	8.6	(7.3–10.1)	0.5	(0.2–1.0)	68.5	(66.0–71.0)
District of Columbia	70.5	(67.9–73.0)	16.4	(14.5–18.5)	2.3	(1.6–3.4)	65.4	(62.7–68.0)
Washington	71.0	(69.9–72.1)	13.9	(13.1–14.7)	2.7	(2.3–3.2)	66.9	(65.8–68.1)
Vermont	71.4	(69.7–73.0)	8.2	(7.3–9.2)	1.0	(0.7–1.5)	68.7	(66.9–70.3)
Maryland	72.4	(70.6–74.1)	14.7	(13.4–16.2)	1.1	(0.7–1.7)	68.8	(66.9–70.6)
Maine	73.4	(71.8–74.9)	11.5	(10.5–12.6)	1.1	(0.8–1.6)	70.4	(68.8–72.0)
Rhode Island	74.1	(72.2–76.0)	9.6	(8.4–10.9)	0.6	(0.3–1.1)	71.8	(69.8–73.6)
Connecticut	74.9	(72.9–76.9)	11.5	(10.2–13.0)	1.1	(0.6–1.9)	72.5	(70.5–74.5)
New Hampshire	75.1	(73.2–76.9)	10.2	(9.1–11.5)	1.0	(0.6–1.5)	72.2	(70.3–74.0)
Massachusetts	75.2	(73.7–76.7)	11.9	(10.9–13.0)	0.8	(0.6–1.2)	72.4	(70.8–73.9)

Abbreviations: CRC = colorectal cancer; CI = confidence interval; FOBT = fecal occult blood test; GED = general equivalency diploma.

* Data were weighted to the age, sex, and racial/ethnic distribution of each state's adult population using intercensal estimates and were age-standardized to the 2010 Behavioral Risk Factor Surveillance System (BRFSS) population.

† FOBT within 1 year, or sigmoidoscopy within 5 years with FOBT within 3 years, or colonoscopy within 10 years (United States Preventive Services Task Force, 2008).

patients who would prefer an alternate test option from following through with screening (*21*).

Provider barriers to colorectal cancer screening include lack of knowledge of current screening guidelines, forgetfulness, competing priorities in the care of the patient (e.g., active comorbid diseases), patient refusal, lack of time, lack of a reminder system, and lack of tracking and follow up systems (*15,23*). Physicians also might overestimate the frequency with which they recommend colorectal cancer screening to their patients because patients often cite lack of a physician recommendation as the reason they did not complete screening (*19,23*).

Health-care system and organizational barriers, other than financial barriers, also exist. Absence of office systems that facilitate identification and referral of patients eligible for screening, insufficient access to primary care providers, insufficient access to or misdistribution of endoscopists, and structural barriers (e.g., lack of transportation, lack of translation services, or availability of screening services only during working hours) can impede access to screening even if provider- and patient-level barriers have been addressed (24–26).

Evidence-based interventions that address many of these barriers exist. *The Guide to Community Preventive Services* (known as the *Community Guide*) (available at http://www.thecommunityguide.org/cancer/index.html) has identified client- and provider-oriented interventions that have been demonstrated to increase cancer screening rates (*26*). Client-oriented interventions (e.g., client reminders, small media, and reducing structural barriers) can address a variety of barriers by, for example, augmenting or replacing a physician recommendation with a reminder, providing patient education about test choices, increasing knowledge about the importance of colorectal cancer screening, or providing screening services after working hours. Provider-oriented interventions (e.g., assessment and feedback or reminder and recall systems) can increase knowledge of current screening guidelines, inform actual screening rates among patients, and create institutionalized systems for screening recommendations.

Other interventions also have demonstrated promise for increasing colorectal cancer screening rates. Patient navigation, which uses laypersons or health professionals from the community to guide patients through the health-care system, has been demonstrated to be effective at increasing screening, particularly among those of lower socioeconomic status and racial/ethnic minorities (*27–29*). Patient navigators can be used to assist in obtaining transportation to appointments, provide one-on-one education, assist with understanding and following colonoscopy preparation and FOBT kit instructions, provide reminder calls, and address patient fears (*27–29*). Although patient navigation programs have been gaining in popularity, the efficacy and cost-effectiveness of these programs has not been well established (*30,31*). Additional research is needed to define more clearly what constitutes an effective patient navigation program and to assess its cost effectiveness.

In July 2009, to address known barriers to colorectal cancer screening, CDC established the Colorectal Cancer Control Program (CRCCP), and currently funds 25 states and four tribal organizations with the stated goal of increasing colorectal cancer screening prevalence among those aged ≥50 years to 80% in funded states and tribal areas by 2014. CRCCP, which provides colorectal cancer screening services to low-income underinsured and uninsured persons aged 50–64 years, focuses primarily on screening promotion to increase population-level screening. The screening promotion portion of the program encourages grantees to implement evidence-based interventions at an organizational, community, and policy level, where the impact will reach a larger proportion of the target population. Successful implementation of these strategies requires partnership and collaboration with nontraditional public health partners, including health systems, insurers, employers, and professional organizations. For example, a grantee might partner with a health system to implement client or provider reminders in all of its affiliated primary care practices or partner with an employer to implement policies that encourage screening. CDC also funds the National Comprehensive Cancer Control Program, which helps states, tribes, and territories to form coalitions that pool resources through partnerships with multiple organizations to reduce cancer burden in their communities.

The findings provided in this report are subject to at least five limitations. First, colorectal cancer screening rates might be overestimated or underestimated because BRFSS does not specify whether a test was for screening or diagnosis. Second, the survey was conducted only among households with a landline telephone, which might result in certain populations being underrepresented. Third, responses are self-reported and not validated by a review of medical records. Fourth, results might differ from other recent reports of colorectal cancer screening prevalence using BRFSS data (*10,11,32*). Questions that allow the analysis of screening with colonoscopy or sigmoidoscopy separately were instituted in BRFSS in 2008. In previous reports, sigmoidoscopy and colonoscopy rates were measured and reported as a combined measure (lower endoscopy) to allow analysis of trends in colorectal cancer screening over time (*10,11,32*). Finally, response rates were low (54.6%), although the BRFSS weighting procedure corrects for nonresponse.

Conclusion

Given the strong association between having health insurance and being up-to-date with colorectal cancer screening, expanding insurance coverage is an important first step to ensuring access to colorectal cancer screening services. Other aspects of the Afforable Care Act also might contribute to increasing access and the use of preventive care services in general, including policies that support expansion of the primary care workforce (ACA §5201–5210), increased funding to community health centers(ACA §10503), and establishment of the Prevention and Public Health Fund (ACA §4002). Additional policies support use of electronic medical records (ACA §4103) and formation of Accountable Care Organizations (ACA §3022), which might lead to better patient care coordination and improved quality. Continued efforts by public health, through partnerships with a wide variety of stakeholders, will be necessary to maximize the potential of these initiatives to increase access to and ensure the equitable distribution and use of colorectal cancer screening services.

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Prevalence of Undiagnosed HIV Infection Among Persons Aged ≥13 Years — National HIV Surveillance System, United States, 2005–2008

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Introduction

In the United States, approximately 1.1 million adults and adolescents are living with human immunodeficiency virus (HIV) infection and, each year, another 50,000 become infected (*1*). At the end of 2008, approximately 20% of the persons living with HIV had an undiagnosed infection (*2*). Of those living with HIV at the end of 2008, nearly two thirds were racial/ethnic minorities and half were men who have sex with men (MSM) (*2*). In 2007, HIV ranked fifth as a leading cause of death among persons aged 35–44 years in the United States but third among blacks or African Americans in this age group (*3*). In 40 states with longstanding confidential name-based HIV surveillance systems, 33% of the estimated 41,768 adults and adolescents diagnosed with HIV infection in 2008 developed acquired immunodeficiency syndrome (AIDS) within 1 year (*4*) and, of these, 44% received their initial diagnosis in an acute care setting, suggesting that they received HIV testing late in the course of the infection. HIV-infected persons who are unaware of their infection or who receive a late diagnosis cannot benefit fully from timely initiation of therapy and are more likely to experience HIV-related morbidity and premature mortality (*5*). In addition, persons unaware of their infection are more likely to transmit HIV to others because of a higher prevalence of high-risk sexual behaviors (*6*) and higher levels of viral RNA that continue to replicate without appropriate antiretroviral treatment (*7*).

This report describes prevalence trends in HIV infection in the United States during 1985–2008 among persons aged ≥13 years who were aware of their infection (i.e., diagnosed HIV infection) and unaware of their infection (i.e., undiagnosed HIV infection) and the characteristics of persons living with diagnosed and undiagnosed HIV infection in 2008. For local and state public health officials and for providers, these estimates can serve as the baseline for focusing efforts and monitoring progress of interventions designed to increase HIV testing, expand HIV screening in health-care settings, and increase early diagnoses of HIV infection.

Methods

To examine the prevalence trends of both diagnosed and undiagnosed HIV infection during 1985–2008 among persons aged ≥13 years and to describe the characteristics of persons aged ≥13 years estimated to be living with diagnosed and undiagnosed HIV infection in 2008, CDC analyzed data from the National HIV Surveillance System, a population-based surveillance system that collects data on persons who have received a diagnosis of HIV infection in the United States. HIV infection is notifiable in all 50 states and the District of Columbia (DC). CDC uses HIV data from states that have had confidential name-based HIV infection reporting for at least 4 years to allow sufficient time to elapse for the calculation of accurate estimates of reporting delays and the reliable determination of trends. Consistent with this requirement, this report includes HIV and AIDS data reported through June 2010 for persons aged ≥13 years at diagnosis from 40 states that had confidential name-based HIV infection reporting as of January 2006 and AIDS data from DC and the 10 other states (California, Delaware, Hawaii, Maryland, Massachusetts, Montana, Oregon, Rhode Island, Vermont, and Washington).

The estimates for the overall HIV prevalence and undiagnosed HIV prevalence at the end of 2008 were obtained in four steps. First, HIV and AIDS data were statistically adjusted to mitigate the effects of 1) delays in reporting new cases and deaths (*4*), 2) incomplete reporting of diagnosed cases (*8*), and 3) cases reported without sufficient risk factor information to be classified into an HIV transmission category (*4*). Second, based on the estimated annual number of HIV diagnoses and the severity of disease at diagnosis (i.e., whether the person received an AIDS diagnosis in the same calendar

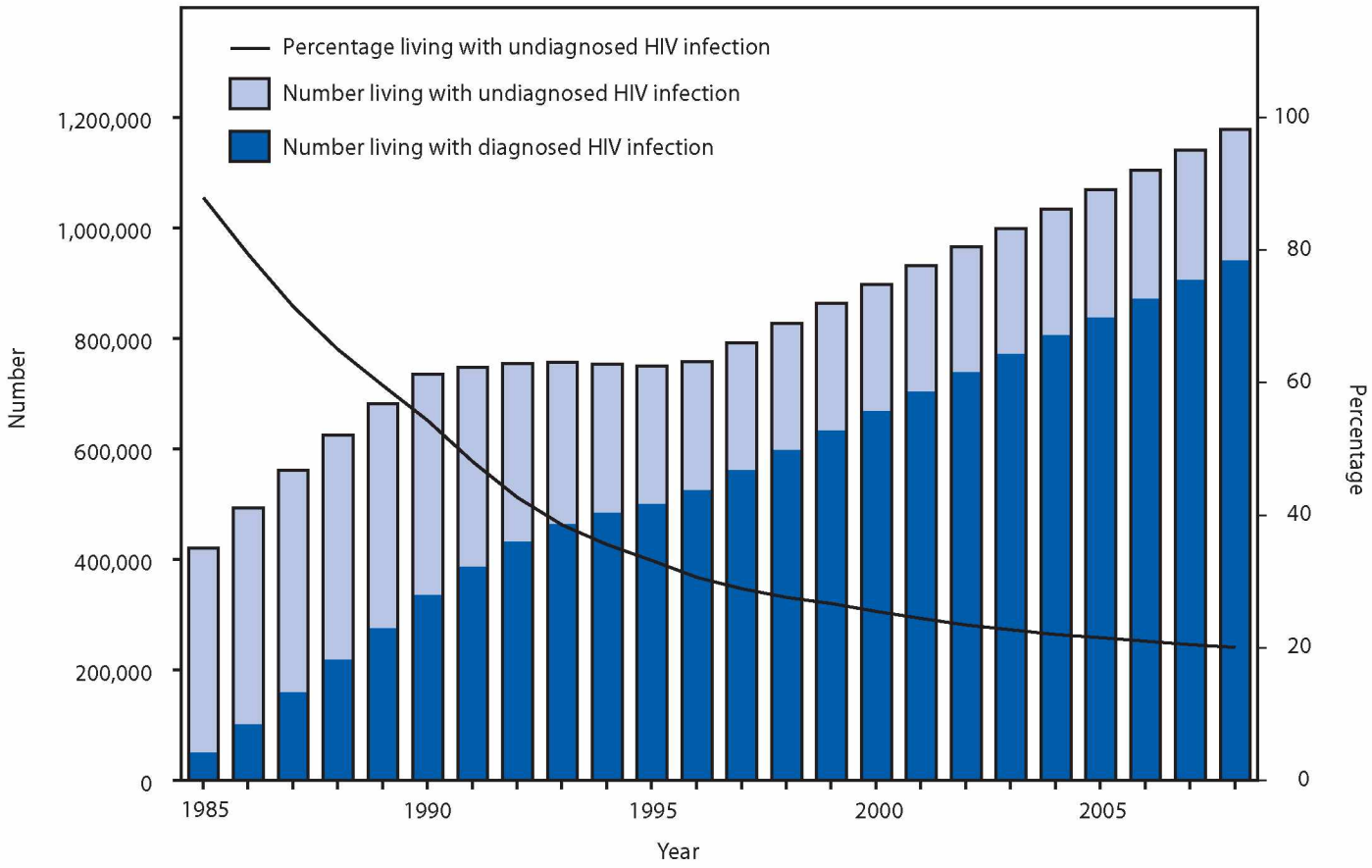
year as the HIV diagnosis), an extended back-calculation model was fitted to estimate the cumulative number of persons aged ≥13 years who had been infected with HIV by the end of 2008 (*8*). Third, the estimated overall HIV prevalence was calculated by subtracting the estimated cumulative number of deaths that had occurred among those infected by the end of 2008 from the estimated cumulative number of HIV infections. Finally, the undiagnosed HIV prevalence was calculated by subtracting the estimated number of diagnosed HIV infections in living persons from the estimated overall HIV prevalence.

Rates per 100,000 population were calculated based on postcensal estimates from the U.S. Census Bureau. The type of facility where persons were initially diagnosed with HIV infection in 2008 in the 40 states was examined using univariate and multivariate log-binomial regression models. Prevalence ratios and 95% confidence intervals (CIs) were calculated to identify factors that were associated with receiving a diagnosis in an acute care setting; an acute care setting included hospital inpatient rooms and emergency departments. Factors included in the models were age at diagnosis, sex, race/ethnicity, HIV transmission category, and timeliness of HIV testing. Persons were classified as testing late in the course of HIV infection (i.e., late testers) if AIDS was diagnosed within 1 year of the initial HIV infection diagnosis. A chi-square test for homogeneity was used to determine whether the characteristics of persons whose type of facility of diagnosis was known differed significantly from those of persons whose type of facility of diagnosis was unknown. Statistical significance was set at $p<0.05$.

Results

In the United States, the estimated number of persons aged ≥13 years living with HIV infection, including those whose infection had not been diagnosed, increased from 420,153 in 1985 to 1,178,250 in 2008 (Figure). HIV prevalence increased

FIGURE. Estimated number of persons aged ≥13 years living with diagnosed and undiagnosed HIV infection* and percentage with undiagnosed HIV infection† — National HIV Surveillance System, United States, 1985–2008



* HIV prevalence estimates were based on national HIV surveillance data for persons aged ≥13 years at diagnosis reported through June 2010 using extended back-calculation.

† The number of undiagnosed HIV infections was calculated by subtracting the estimated number of diagnosed HIV infections in living persons from the estimated overall HIV prevalence.

by an estimated 55.4% between 1996 (758,283), when highly active antiretroviral therapy became widely available in the United States, and 2008. Although the estimated percentage of undiagnosed HIV infections has decreased substantially, from 87.9% in 1985 to 20.1% in 2008, the percentage persisted at approximately 20% from 2004 to 2008.

The majority of the 1,178,250 persons aged ≥13 years living with HIV infection at the end of 2008 were male (75%), racial/ethnic minorities (66%), and aged 35–54 years (63%) (Table 1). MSM represented 66% of the 883,300 males estimated to be living with HIV infection, and black or African American females represented 64% of the 294,800 females. At the end of 2008, a total of 2,536.1 per 100,000 black or African American males and 897.3 per 100,000 Hispanic or Latino males were living with HIV infection, compared with 419.4 per 100,000 white males. Correspondingly, the rate of HIV prevalence among black or African American females (1,184.9 per 100,000) and Hispanic or Latino females (263.1 per 100,000) were 18 times and 4 times the rate among white females (66.4 per 100,000), respectively. Compared with the overall 20.1% undiagnosed HIV infection prevalence, greater percentages of undiagnosed HIV infection were observed among persons aged <35 years (13–24 years: 58.9%; 25–34 years: 31.5%), black or African American MSM (25.7%), men with high-risk heterosexual contact (24.9%), American Indians or Alaska Natives (25.0%), and Asians or Pacific Islanders (25.9%). The prevalence rate of undiagnosed HIV infection was highest among black or African American males (570.7 per 100,000), black or African American females (228.8 per 100,000), and Hispanic or Latino males (177.8 per 100,000) and lowest among Asian or Pacific Islander females (12.6 per 100,000) and white females (10.9 per 100,000).

The type of facility of initial diagnosis was known for 32,647 (78.1%) of the estimated 41,768 persons aged ≥13 years whose HIV infection was diagnosed in 2008 in the 40 states (Table 2). The majority (74.3%) of diagnoses occurred in a clinical setting, almost one fourth each in an acute care setting (24.8%) and at a private doctor's office or health maintenance organization (HMO) (24.3%). The probability of initial diagnosis in an acute care setting was significantly higher among persons aged ≥55 years at diagnosis compared with persons aged 35–44 years (55–64 years: prevalence ratio [PR] =1.22, 95% CI = 1.15–1.29; ≥65 years: PR = 1.39, 95% CI = 1.28–1.51), blacks or African Americans (PR = 1.21, 95% CI = 1.15–1.26), and Hispanics or Latinos (PR = 1.17, 95% CI = 1.10–1.23) compared with whites, persons with a history of injection drug use compared with MSM (PR = 1.36, 95% CI = 1.29–1.44), and late testers compared with persons who were not late testers (PR = 2.53, 95% CI = 2.43–2.63).

Discussion

HIV diagnosis is essential as the entry point for a lifelong continuum of care and treatment that benefits the health, quality of life, and life expectancy of the infected person and reduces the likelihood of HIV transmission to others (*5–7*). However, in the United States, the engagement of HIV-infected persons in this continuum of care for HIV infection needs improvement. As indicated by the findings in this report, approximately 80% of persons infected with HIV are aware of their infection. Furthermore, only approximately 77% of HIV-diagnosed persons are linked to care within 3–4 months after diagnosis, and only approximately 51% of those with a diagnosis of HIV infection are engaged in long-term care (*9*). Among persons in care, approximately 89% are prescribed antiretroviral medications and of these, approximately 77% achieve plasma viral load suppression (≤200 copies/mL) (*9*). Overall, only approximately 28% of HIV-infected persons in the United States are aware of their infection, are in care, are receiving antiretroviral therapy, and have a suppressed HIV viral load (*9*).

To increase HIV testing and promote early detection of HIV infection, in 2006, CDC recommended routine HIV screening for all patients aged 13–64 years in health-care settings with a prevalence of undiagnosed HIV infection of ≥0.1%, all pregnant women, and patients initiating or seeking treatment for tuberculosis or sexually transmitted infections (*10*). The U.S. Preventive Services Task Force (USPSTF) also released recommendations in 2005 (rated as strongly recommended, or grade A recommendations, by USPSTF) for HIV screening of all pregnant women and all adults and adolescents at increased risk for HIV infection and those seen in health-care settings with ≥1% prevalence of infection (*11*). CDC further recommended in 2006 that persons at high risk for HIV infection should be screened at least annually (*10*). However, among the 7,271 MSM who were surveyed and tested for HIV infection by the National HIV Behavioral Surveillance System (NHBS) in 21 U.S. cities in 2008 and who did not report having received a diagnosis of HIV infection in the past, only 61% had been tested during the preceding 12 months and of these, 7% received their first HIV-positive result as part of NHBS (*12*).

To guide local, state, and national efforts to increase the percentages of persons engaged in the continuum from HIV diagnosis to viral load suppression, the 2010 National HIV/AIDS Strategy (*13*) emphasizes prevention and intervention service provision at clinics, community centers, and nontraditional settings (e.g., mental health centers). These services include HIV testing, as well as linkage to and retention in long-term quality care that seeks to sustain viral

TABLE 1. Estimated number and rate of persons aged ≥13 years living with HIV infection and number, percentage, and rate of persons aged ≥13 years with undiagnosed HIV infection, by selected characteristics — National HIV Surveillance System, United States,* 2008

	Persons living with HIV infection				Persons with undiagnosed HIV infection				
	No.	(95% CI)	Rate†	(95% CI)	No.	(95% CI)	%	Rate	(95% CI)
Total	**1,178,250**	**(1,128,250–1,228,400)**	**469.4**	**(449.5–489.4)**	**236,250**	**(224,750–247,750)**	**20.1**	**94.1**	**(89.5–98.7)**
Age group (yrs)									
13–24	68,600	(56,000–80,600)	134.1	(109.5–157.6)	40,400	(35,400–45,400)	58.9	79.0	(69.2–88.7)
25–34	180,600	(160,600–200,600)	440.9	(392.1–489.8)	56,800	(51,300–62,300)	31.5	138.7	(125.3–152.1)
35–44	357,500	(327,500–387,500)	846.3	(775.3–917.4)	64,300	(58,300–70,300)	18.0	152.2	(138.0–166.4)
45–54	385,400	(353,400–417,400)	871.3	(798.9–943.6)	53,200	(48,200–58,200)	13.8	120.3	(109.0–131.6)
55–64	147,700	(132,770–162,770)	439.3	(394.9–484.1)	17,600	(15,600–19,600)	11.9	52.3	(46.4–58.3)
≥65	38,400	(34,400–42,400)	99.0	(88.7–109.3)	4,100	(3,600–4,600)	10.7	10.6	(9.3–11.9)
White									
MSM	275,400	(247,400–303,400)	—	—	53,300	(47,800–58,800)	19.4	—	—
IDU									
Male	27,200	(19,500–34,900)	—	—	4,150	(2,600–5,700)	15.3	—	—
Female	20,400	(14,600–26,200)	—	—	3,250	(1,900–4,600)	15.9	—	—
MSM and IDU	26,600	(19,600–33,600)	—	—	3,200	(1,750–4,650)	12.0	—	—
Heterosexual§									
Male	16,350	(10,600–22,100)	—	—	4,700	(3,050–6,350)	28.7	—	—
Female	36,750	(27,700–45,800)	—	—	6,100	(4,200–80,000)	16.6	—	—
Other¶	3,400	(2,500–4,300)	—	—	500	(150–900)	14.7	—	—
Total									
Male	**348,100**	**(320,100–376,100)**	**419.4**	**(385.7–453.1)**	**65,600**	**(61,000–70,100)**	**18.8**	**79.0**	**(73.5–84.5)**
Female	**58,000**	**(47,500–68,500)**	**66.4**	**(54.4–78.5)**	**9,550**	**(7,900–11,100)**	**16.5**	**10.9**	**(9.0–12.7)**
Black/African American									
MSM	187,400	(164,400–210,400)	—	—	48,200	(43,000–53,400)	25.7	—	—
IDU									
Male	74,400	(61,600–87,200)	—	—	12,200	(9,550–14,850)	16.4	—	—
Female	42,700	(34,300–51,100)	—	—	6,400	(4,500–8,300)	15.0	—	—
MSM and IDU	19,300	(13,400–25,200)	—	—	1,900	(800–3,000)	9.8	—	—
Heterosexual									
Male	73,300	(61,100–85,500)	—	—	17,300	(14,100–20,500)	23.6	—	—
Female	144,000	(126,100–161,900)	—	—	29,800	(25,600–34,000)	20.7	—	—
Other	3,900	(2,900–4,900)	—	—	800	(250–1,350)	20.5	—	—
Total									
Male	**356,400**	**(328,400–384,400)**	**2,536.1**	**(2,336.9–2,735.4)**	**80,200**	**(72,100–88,300)**	**22.5**	**570.7**	**(513.1–628.3)**
Female	**188,500**	**(170,000–207,000)**	**1,184.9**	**(1,068.6–1,301.2)**	**36,400**	**(31,900–40,900)**	**19.3**	**228.8**	**(200.5–257.1)**
Hispanic/Latino									
MSM	104,800	(87,800–121,800)	—	—	24,000	(20,300–27,700)	22.9	—	—
IDU									
Male	28,800	(20,800–36,800)	—	—	2,200	(1,100–3,300)	7.6	—	—
Female	9,900	(5,900–13,900)	—	—	700	(200–1,200)	7.1	—	—
MSM and IDU	8,200	(6,800–9,600)	—	—	950	(200–1,650)	11.6	—	—
Heterosexual									
Male	18,700	(12,500–24,900)	—	—	4,600	(3,000–6,200)	24.6	—	—
Female	33,300	(24,700–41,900)	—	—	6,200	(4,300–8,100)	18.6	—	—
Other	1,650	(1,000–2,300)	—	—	200	(125–400)	12.1	—	—
Total									
Male	**161,500**	**(145,500–177,500)**	**897.3**	**(808.4–986.2)**	**32,000**	**(27,500–36,500)**	**19.8**	**177.8**	**(152.8–202.8)**
Female	**43,800**	**(33,800–53,800)**	**263.1**	**(203.0–323.2)**	**6,800**	**(4,800–8,800)**	**15.5**	**40.8**	**(28.8–52.9)**
American Indian/Alaska Native									
MSM	2,200	(1,800–2,600)	—	—	500	(200–800)	22.7	—	—
IDU									
Male	520	(370–700)	—	—	150	(70–300)	28.8	—	—
Female	500	(350–680)	—	—	100	(50–200)	20.0	—	—
MSM and IDU	480	(420–630)	—	—	60	(30–120)	12.5	—	—
Heterosexual									
Male	350	(200–500)	—	—	150	(80–250)	42.9	—	—
Female	850	(600–1,100)	—	—	250	(120–500)	29.4	—	—
Other	100	(50–200)	—	—	40	(20–100)	40.0	—	—
Total									
Male	**3,550**	**(2,400–4,700)**	**389.8**	**(263.5–516.0)**	**860**	**(460–1,260)**	**24.2**	**94.4**	**(50.5–138.3)**
Female	**1,450**	**(900–2,000)**	**152.7**	**(94.8–210.7)**	**390**	**(140–650)**	**26.9**	**41.1**	**(14.7–68.5)**

See footnotes on page 61.

TABLE 1. (*Continued*) Estimated number and rate of persons aged ≥13 years living with HIV infection and number, percentage, and rate of persons aged ≥13 years with undiagnosed HIV infection, by selected characteristics — National HIV Surveillance System, United States,* 2008

	Persons living with HIV infection				Persons with undiagnosed HIV infection				
	No.	(95% CI)	Rate†	(95% CI)	No.	(95% CI)	%	Rate	(95% CI)
Asian/Pacific Islander									
MSM	10,200	(8,000–12,400)	—	—	2,400	(1,200–3,600)	23.5	—	—
IDU									
Male	760	(550–1,000)	—	—	200	(120–350)	26.3	—	—
Female	340	(240–500)	—	—	60	(30–120)	17.6	—	—
MSM and IDU	500	(400–700)	—	—	40	(20— 100)	8.0	—	—
Heterosexual									
Male	2,100	(1,100–3,100)	—	—	880	(480–1,280)	41.9	—	—
Female	2,550	(2,000–3,000)	—	—	650	(400–1,100)	25.5	—	—
Other	350	(225–500)	—	—	120	(50–210)	34.3	—	—
Total									
Male	**13,750**	**(11,300–16,150)**	**252.2**	**(207.2–296.2)**	**3,600**	**(2,300–4,900)**	**26.2**	**66.0**	**(42.2–89.9)**
Female	**3,050**	**(2,150–4,050)**	**51.3**	**(36.2–68.1)**	**750**	**(400–1,100)**	**24.6**	**12.6**	**(6.7–18.5)**

Abbreviations: CI = confidence interval; IDU = injection-drug user; MSM = men who have sex with men.
* Estimates derived using extended back-calculation on HIV and AIDS data for persons aged ≥13 years at diagnosis from 40 states that had confidential name-based HIV infection reporting as of January 2006 and AIDS data from 10 states (California, Delaware, Hawaii, Maryland, Massachusetts, Montana, Oregon, Rhode Island, Vermont, and Washington) and the District of Columbia.
† Per 100,000 population. Rates for transmission category subgroups were not calculated because population denominators were unavailable.
§ Heterosexual contact with a person known to have, or to be at high risk for, HIV infection.
¶ Includes hemophilia, blood transfusion, perinatal exposure, and risk factor not reported or not identified.

load suppression through promotion of adherence after timely initiation of antiretroviral therapy and provision of coordinated care for therapy-associated complications, other coinfections, substance addiction, and mental health issues. HIV testing of all pregnant women and treatment of HIV-infected pregnant women is essential to prevent perinatal transmission. Other prevention services that can be incorporated into health care include HIV risk behavior assessment and risk reduction counseling, condom distribution for HIV-infected and -uninfected persons and a broad array of partner services. New and emerging preventive care in health-care settings includes preexposure prophylaxis for at-risk MSM and male circumcision (*14–17*).

The Patient Protection and Affordable Care Act of 2010 as amended by the Healthcare and Education Reconciliation Act of 2010 (referred to collectively as the Affordable Care Act [ACA]), which was signed into law in March 2010, creates an opportune environment for implementing the National HIV/AIDS Strategy and makes its goals more achievable. Under the new law, persons who are living with or at increased risk for HIV infection such as young minority men will be more likely to be screened for HIV and to receive life-saving treatment and services that strengthen their ability to adhere to treatment regimens. The law provides greater health-care access to those who are currently uninsured or underinsured by

- expanding Medicaid coverage to persons with incomes ≤133% of the federal poverty level (FPL) (ACA §2001);
- establishing state-based health insurance exchanges (ACA §1311) to make private health insurance available to small employers and to individuals and families not eligible for Medicaid or the Children's Health Insurance Program and providing tax credits for those at 100%–400% of FPL; and
- increasing funding to community health centers (ACA §5601).

The Affordable Care Act provides for no cost sharing for high-value clinical preventive services, including HIV testing for adolescents and adults at increased risk for HIV infection. Medicare now covers adult clinical preventive services graded A (strongly recommended) or B (recommended) by USPSTF and vaccinations recommended by the Advisory Committee on Immunization Practices, with no cost sharing to beneficiaries. These services, in addition to recommended preventive services for children, youths, and women, will be covered with no cost sharing by newly qualified private health plans operating in the state-based insurance exchanges beginning in 2014. Beginning in 2013, state Medicaid programs that eliminate cost sharing for these clinical preventive services may receive enhanced federal matching funds for them.

Furthermore, the new law demands more provider accountability for factors within their control and commences more improvements in the health outcomes of HIV-infected persons through well-timed, better, and safer care. The law calls for

- the National Strategy for Quality Improvement in Health Care (ACA §3011) to prioritize, guide, and coordinate local, state, and national efforts to promote the most effective prevention and treatment practices for the leading

TABLE 2. Type of facility in which initial HIV diagnosis was received among persons aged ≥13 years who received an HIV diagnosis,* by selected characteristics — National HIV Surveillance System, United States,† 2008

		Clinical facilities						Other facilities				
		Private physician or HMO	Hospital inpatient room or emergency department	STD clinic	Correctional facility	Other clinical facility¶	Subtotal	AIDS clinic or counseling and testing site	Other setting**	Subtotal	Prevalence ratio††	
Characteristic	Total§	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)		(95% CI)
Total	**32,647**	**7,945 (24.3)**	**8,103 (24.8)**	**2,246 (6.9)**	**2,184 (6.7)**	**3,785 (11.6)**	**24,263 (74.3)**	**5,904 (18.1)**	**2,480 (7.6)**	**8,384 (25.7)**	—	—
Age group (yrs)												
13–24	5,969	1,042 (17.5)	863 (14.5)	744 (12.5)	330 (5.5)	880 (14.7)	3,858 (64.6)	1,464 (24.5)	647 (10.8)	2,111 (35.4)	0.70	(0.64–0.74)
25–34	8,571	2,017 (23.5)	1,779 (20.8)	699 (8.2)	657 (7.7)	1,018 (11.9)	6,170 (72.0)	1,709 (19.9)	692 (8.1)	2,401 (28.0)	0.87	(0.83–0.92)
35–44	8,734	2,330 (26.7)	2,311 (26.5)	484 (5.6)	661 (7.6)	884 (10.1)	6,670 (76.4)	1,464 (16.8)	600 (6.9)	2,064 (23.6)	1.00	—
45–54	6,541	1,776 (27.2)	2,021 (30.9)	246 (3.8)	461 (7.0)	686 (10.5)	5,190 (79.4)	948 (14.5)	403 (6.2)	1,351 (20.7)	1.10	(1.05–1.15)
55–64	2,272	613 (27.0)	873 (38.4)	65 (2.8)	73 (3.2)	267 (11.8)	1,890 (83.2)	269 (11.9)	112 (4.9)	381 (16.8)	1.22	(1.15–1.29)
≥65	561	167 (29.8)	257 (45.9)	7 (1.3)	3 (0.6)	50 (9.0)	485 (86.5)	49 (8.8)	27 (4.8)	76 (13.5)	1.39	(1.28–1.51)
Sex												
Male	24,488	5,966 (24.4)	5,816 (23.8)	1,802 (7.4)	1,778 (7.3)	2,580 (10.5)	17,942 (73.3)	4,644 (19.0)	1,902 (7.8)	6,546 (26.7)	1.00	—
Female	8,159	1,979 (24.3)	2,287 (28.0)	444 (5.4)	405 (5.0)	1,205 (14.8)	6,321 (77.5)	1,260 (15.4)	579 (7.1)	1,838 (22.5)	1.05	(1.00–1.10)
Race/Ethnicity												
American Indian/ Alaska Native	161	31 (19.3)	42 (26.3)	11 (6.9)	4 (2.6)	27 (16.5)	116 (71.6)	31 (19.4)	15 (9.0)	46 (28.4)	1.17	(0.92–1.47)
Asian	347	130 (37.4)	70 (20.0)	21 (6.1)	1 (0.3)	47 (13.5)	268 (77.3)	58 (16.7)	21 (6.0)	79 (22.8)	0.96	(0.78–1.18)
Black/African American	16,596	3,194 (19.3)	4,377 (26.4)	1,318 (7.9)	1,391 (8.4)	2,062 (12.4)	12,343 (74.4)	2,858 (17.2)	1,396 (8.4)	4,253 (25.6)	1.21	(1.15–1.26)
Hispanic/Latino	5,760	1,332 (23.1)	1,498 (26.0)	415 (7.2)	355 (6.2)	605 (10.5)	4,206 (73.0)	1,232 (21.4)	321 (5.6)	1,554 (27.0)	1.17	(1.10–1.23)
Native Hawaiian/ Other Pacific Islander	30	2 (7.0)	5 (15.6)	2 (5.0)	2 (6.7)	6 (20.8)	17 (55.0)	13 (41.6)	1 (3.4)	14 (45.0)	0.79	(0.36–1.73)
White	9,325	3,151 (33.8)	1,986 (21.3)	457 (4.9)	405 (4.3)	995 (10.7)	6,994 (75.0)	1,636 (17.5)	695 (7.5)	2,331 (25.0)	1.00	—
Multiple races	427	104 (24.4)	126 (29.4)	22 (5.2)	24 (5.7)	43 (10.0)	319 (74.8)	76 (17.8)	31 (7.4)	108 (25.2)	1.23	(1.07–1.41)
Transmission category												
MSM	17,769	4,808 (27.1)	3,709 (20.9)	1,469 (8.3)	816 (4.6)	1,965 (11.1)	12,766 (71.9)	3,628 (20.4)	1,374 (7.7)	5,003 (28.2)	1.00	—
IDU	3,278	412 (12.6)	1,248 (38.1)	115 (3.5)	547 (16.7)	327 (10.0)	2,649 (80.8)	437 (13.3)	192 (5.9)	629 (19.2)	1.36	(1.29–1.44)
MSM and IDU	934	158 (17.0)	232 (24.9)	52 (5.6)	137 (14.7)	93 (9.9)	672 (72.0)	175 (18.8)	86 (9.2)	262 (28.0)	1.13	(1.01–1.25)
Heterosexual contact§§	10,574	2,547 (24.1)	2,872 (27.2)	609 (5.8)	680 (6.4)	1,385 (13.1)	8,093 (76.5)	1,657 (15.7)	824 (7.8)	2,482 (23.5)	1.09	(1.04–1.15)
Other¶¶	92	20 (21.5)	42 (46.3)	1 (1.6)	3 (3.7)	15 (16.9)	82 (89.1)	6 (6.5)	3 (3.5)	9 (10.1)	1.23	(1.01–1.50)
Timeliness of testing												
Not late tester	22,051	5,671 (25.7)	3,445 (15.6)	1,883 (8.5)	1,747 (7.9)	2,687 (12.2)	15,434 (70.0)	4,556 (20.7)	2,061 (9.4)	6,617 (30.0)	1.00	—
Late tester***	10,596	2,274 (21.5)	4,658 (44.0)	363 (3.4)	436 (4.1)	1,097 (10.4)	8,829 (83.3)	1,348 (12.7)	419 (4.0)	1,767 (16.7)	2.53	(2.43–2.63)

Abbreviations: AIDS = acquired immunodeficiency syndrome; CI = confidence interval; IDU = injection-drug user; HIV = human immunodeficiency virus; HMO = health maintenance organization; MSM = men who have sex with men; STD = sexually transmitted disease.

* Data include persons with a diagnosis of HIV infection regardless of stage of disease at diagnosis. Data have been statistically adjusted for reporting delays and missing risk factor information but not for incomplete reporting.

† Includes data from 40 states that had confidential name-based HIV infection as of January 2006 (which excludes California, Delaware, Hawaii, Maryland, Massachusetts, Montana, Oregon, Rhode Island, Vermont, Washington, and the District of Columbia).

§ Total excludes 9,121 persons whose type of facility of diagnosis was unknown or missing and 17 persons whose month of diagnosis of HIV infection was unknown.

¶ Includes drug treatment facility, family planning clinic, prenatal clinic, tuberculosis clinic, and other clinic.

** Includes employer or insurance company clinic, military induction or military service site, immigration site, and other nonclinical setting.

†† Prevalence ratio for being diagnosed in an acute care setting, which includes hospital inpatient rooms and emergency departments.

§§ Heterosexual contact with a person known to have HIV infection or to be at high risk for acquiring HIV infection.

¶¶ Includes hemophilia, blood transfusion, perinatal exposure, and risk factors not reported or not identified.

*** Includes persons who received an AIDS diagnosis within 1 year of their initial HIV infection diagnosis.

causes of death in the United States and reduce health disparities;
- the development of standards to measure the performance of clinicians, service providers, health plans, and population health (ACA §3013);
- the improvement of public reporting initiatives that enable consumers to review and compare clinician and service provider performance (ACA §3015);
- the establishment of community-based health teams to support primary care practices (ACA §3502); and
- the implementation of medication management through licensed pharmacists (ACA §3503).

The findings in this report are subject to at least four limitations. First, HIV data used in the extended back-calculation represent only a portion of persons in the United States who received a diagnosis of HIV infection; several high-morbidity areas such as California, DC, and Maryland contributed AIDS data but not HIV data because confidential name-based HIV infection reporting was not implemented in these areas until after January 2006. The availability of reported HIV data from these areas will increase the accuracy of future national prevalence estimates. Second, not all HIV-infected persons have received a diagnosis of infection and been reported to the public health surveillance systems; data must be estimated for persons whose infection is undiagnosed. Third, statistical uncertainties were introduced in the estimates because data were adjusted for reporting delays, incomplete reporting, and missing HIV transmission category information. Finally, the type of facility where HIV infection was diagnosed initially was unknown for 22% of persons aged ≥13 years who received their diagnosis in 2008 in the 40 states. However, except for a higher percentage of late testers among persons with unknown facility type (35% vs. 32%, $p<0.001$), no significant difference in demographic characteristics and HIV transmission category was found between persons whose type of facility of diagnosis was known and persons whose type of facility of diagnosis was unknown.

Conclusion

HIV diminishes quality of life and productivity, increases the number of preventable deaths, and increases health-care expenditures. Based on the estimated incidence of HIV infection in 2009 (*1*) and the adjusted lifetime cost of HIV care in the United States to reflect 2010 U.S. dollars (*18*), CDC estimates that the total cost for treating HIV infection in the United States is $18.3 billion per year. To reduce the number of new HIV infections and thereby the ultimate cost of HIV, the National HIV/AIDS Strategy intends to increase 1) the percentage of persons living with HIV infection who know their serostatus to 90%; 2) the percentage of persons with a new HIV diagnosis who are linked into clinical care within 3 months of their diagnosis to 85%; 3) the percentage of Ryan White HIV/AIDS program (*19*) clients who are in continuous care to 80%; and 4) the percentage of HIV-diagnosed MSM, blacks or African Americans, and Hispanics or Latinos with undetectable viral load by 20% by 2015. These targets will not be met without the expansion of HIV prevention and intervention service delivery in health care. Only by combining expertise and efforts can public health professionals and health-care providers ensure greater public awareness of HIV infection and risk reduction, eliminate HIV-related stigma and discrimination, expand opportunities for HIV testing, increase the frequency of testing in high-risk populations, and establish a seamless prevention, intervention, care, and treatment infrastructure through which every HIV-infected person is able to receive the right care and support at the right time.

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Influenza Vaccination Coverage Among Adults — National Health Interview Survey, United States, 2008–09 Influenza Season

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Introduction

In the United States, annual influenza epidemics typically occur during the late fall through early spring. During these epidemics, rates of serious illness and death are highest among adults aged ≥65 years, children aged <2 years, and persons of any age who have medical conditions that increase their risk for complications from influenza (*1–4*). Adults aged 50–64 years who have underlying medical conditions have a substantially increased risk for hospitalization during the influenza season (*5*). Influenza illness among healthy adults aged 18–64 years typically is not as severe as the illness among adults aged ≥65 years, pregnant women, or persons with chronic medical conditions and less frequently results in hospitalization. However, influenza among healthy adults aged 18–49 years is an important cause of outpatient medical visits and worker absenteeism. An economic analysis estimated an annual average of approximately 5 million illnesses, 2.4 million outpatient visits, 32,000 hospitalizations, and 680 deaths from influenza among adults aged 18–49 years who did not have a medical condition that increased their risk for influenza complications (*6*). In this analysis, adults aged 18–49 years accounted for 10% of the total economic cost from influenza, or approximately $8.7 billion (*6*).

The most effective strategy for preventing influenza is annual influenza vaccination. Routine influenza vaccination has been recommended since the 2010–11 influenza season for all persons aged ≥6 months (*4*). Before this recommendation, the only group that was not recommended for routine vaccination was healthy nonpregnant adults aged 18–49 years who did not have an occupational risk for influenza exposure and who were not close contacts of persons at higher risk for influenza-related complications. According to the Patient Protection and Affordable Care Act of 2010 as amended by the Healthcare and Education Reconciliation Act of 2010 (referred to collectively as the Affordable Care Act [ACA]), as of January 1, 2014, all newly qualified health plans operating in the exchanges* must provide coverage without cost sharing for all persons, including those aged 18–64 years, for vaccinations recommended by the Advisory Committee on Immunization Practices (ACIP) (*7*). Influenza vaccination for adults aged ≥65 years has been a covered benefit for many years under Medicare (*4*). Adults aged ≥65 years have had higher influenza vaccination coverage (>62%) than persons in all other age groups (*4*). This report examines factors associated with influenza vaccination during the 2008–09 influenza season and suggests ways that the provisions of the Affordable Care Act might improve access to vaccination and influenza vaccination coverage. The information in this report is intended for all persons involved in annual influenza vaccination, as well as those for whom annual influenza vaccination is recommended. The results can serve as a baseline to monitor the progress and impact of clinical preventive services.

Methods

To estimate seasonal influenza vaccination coverage among adults aged 18–64 years during the 2008–09 influenza season, CDC analyzed data from the 2009 National Health Interview Survey (NHIS). NHIS collects information about the health and health care of the noninstitutionalized, civilian population in the United States and is designed to produce nationally representative samples. The NHIS questionnaire includes a set of basic health and demographic questions and questions on access to health care and use. Interviews are conducted in respondents' homes continuously throughout the year by interviewers of the U.S. Census Bureau for CDC.

* Beginning in 2014, a competitive insurance marketplace will be set up in the form of state-based insurance exchanges. These exchanges will allow eligible persons and small businesses with up to 100 employees to purchase health insurance plans that meet criteria outlined in the Affordable Care Act (ACA §1311). If a state does not create an exchange, the federal government will run one in that state.

To ascertain coverage estimates, participants were asked the following questions: 1) "During the past 12 months, have you had a flu shot?" and 2) "During what year and month did you receive your flu vaccine?" To ascertain coverage among persons with higher risk for complications from influenza, respondents were asked whether they had ever been told by a physician or other health professional that they have diabetes, emphysema, cancer or a malignancy of any kind (excluding nonmelanoma skin cancer), lymphoma, leukemia, or blood cancer or had coronary heart disease, angina, a heart attack, or another heart condition. Respondents also were asked whether, in the past 12 months, they had experienced an asthma episode or attack or had been told by a physician they have chronic bronchitis or weak or failing kidneys. Covariates were selected to measure associations among influenza vaccination and selected demographic and health-care access characteristics: age group, sex, race and ethnicity, marital status, educational level, employment status, poverty level, health insurance status, primary provider status, physician contacts in the previous year, hospitalization within the past year, having certain high-risk conditions, and current employment as health-care personnel.

Poverty status was defined using 2009 poverty thresholds published by the U.S. Census Bureau; below poverty was defined as a total family income of <$21,756 for a family of four (available at http://www.census.gov/hhes/www/poverty/data/threshld/thresh09.html). Respondents were classified as health-care personnel if they were currently employed in a health-care occupation or in a health-care industry setting, based on standard occupation and industry categories recoded into categories by CDC. Respondents were classified as having a regular physician if they answered affirmatively to the question, "Is there a place that you usually go to when you are sick or need advice about your health?" Although female respondents were asked whether they were pregnant at the time of the interview, estimates of influenza vaccination among pregnant women are not presented because they might be misleading. Women who became pregnant at other times during the influenza vaccination period would not be counted in the analysis, and information on the stage of pregnancy or estimated date of delivery was not available.

Kaplan-Meier survival analysis was used to determine the cumulative influenza vaccination coverage during August 2008–May 2009 using monthly interview data collected during September 2008–June 2009. Data weighting procedures are described in more detail elsewhere (*8*). Point estimates and estimates of corresponding variances for this analysis were calculated using statistical software to account for the complex sampling design of NHIS. Chi-square tests were used to examine significance between age groups, and t-tests were used to determine significance within strata with multiple levels. Statistical significance was defined as $p<0.05$.

Results

A total of 11,963 adults aged 18–64 years were included in the analysis. An estimated 70.1% were aged 18–49 years, and 29.9% were aged 50–64 years (Table 1). Most respondents (72.1%) indicated that they were employed; 13.4% of respondents had incomes below the poverty level. Most respondents (67.2%) had private insurance; however, 20.3% of respondents aged 18–64 years reported having no insurance, including 23.6% of those aged 18–49 years. A total of 81.4% of respondents reported having a regular physician, and 79.2% had at least one or more physician contacts within the past year. Among adults aged 18–64 years, 20.2% reported having a high-risk condition. Health-care personnel comprised 8.8% of respondents.

Influenza vaccination coverage overall during the 2008–09 influenza season for adults aged 18–64 years was 28.2% (Table 2). Coverage was significantly higher among adults aged 50–64 years than among those aged 18–49 years, both overall and by most demographic and health-care access characteristics examined. Influenza vaccination coverage for Hispanic adults aged 18–49 and 50–64 years was significantly lower than coverage among non-Hispanic whites in those age groups. Influenza vaccination coverage among non-Hispanic blacks and non-Hispanic whites aged 18–49 and 50–64 years was similar. Respondents aged 18–49 years and 50–64 years who were at or above the poverty level had higher influenza vaccination coverage (23.6% and 42.8%, respectively) than those who were below poverty (16.7% and 34.9%, respectively). In both age groups (18–49 and 50–64 years), influenza vaccination coverage was higher among adults with high-risk conditions (31.9% and 51.2%, respectively) compared with those without identified high-risk conditions (20.8% and 37.2%, respectively). Respondents with diabetes had higher influenza vaccination levels (49.0%) than those with heart disease (42.5%) or asthma (38.7%). Overall, influenza vaccination coverage among adults with high-risk conditions was 41.4%. Respondents who were health-care personnel had significantly higher influenza vaccination coverage (53.0%) than those who were not health-care personnel (25.8%). Women aged 18–49 years and 50–64 years had statistically higher influenza vaccination coverage than men in the same age groups (26.7% vs. 18.0% and 44.2% vs. 39.3%, respectively).

Influenza vaccination coverage was substantially higher among younger (18–49 years) and older (50–64 years) adults who had health insurance (whether private or public)

TABLE 1. Demographic characteristics, health insurance status, and selected health conditions among adults aged 18–64 years, by age group* — National Health Interview Survey, United States, 2008–09 influenza season

	Age group (yrs)					
	18–64		18–49		50–64	
Characteristic	No.	(%)	No.	(%)	No.	(%)
Total	**11,963**	**(100)**	**8,312**	**(70.1)**	**3,651**	**(29.9)**
Sex						
Male	5,335	(49.0)	3,686	(49.4)	1,649	(48.2)
Female	6,628	(51.0)	4,626	(50.6)	2,002	(51.8)
Race/Ethnicity						
White, non-Hispanic	6,908	(67.2)	4,434	(63.9)	2,474	(74.9)†
Black, non-Hispanic	1,917	(12.3)	1,349	(12.9)	568	(10.8)
Hispanic	2,305	(14.9)	1,882	(17.1)	423	(9.7)
Other	833	(5.7)	647	(6.1)	186	(4.6)
Marital status						
Married	5,510	(54.6)	3,614	(49.8)	1,896	(65.7)†
Widowed, divorced, or separated	2,337	(13.1)	1,147	(9.2)	1,190	(22.1)
Never married	4,087	(32.3)	3,529	(40.9)	558	(12.2)
Education						
<High school diploma	1,767	(13.3)	1,243	(13.6)	524	(12.4)†
High school diploma	3,009	(26.0)	1,978	(24.5)	1,031	(29.3)
Some college, college graduate, or higher	7,135	(60.8)	5,058	(61.8)	2,077	(58.3)
Employment status						
Employed	8,479	(72.1)	6,145	(75.0)	2,334	(65.6)†
Not employed	3,481	(27.9)	2,165	(25.0)	1,316	(34.4)
Poverty status§						
At or above poverty level	8,948	(86.6)	6,131	(85.0)	2,817	(90.5)†
Below poverty level	1,877	(13.4)	1,464	(15.0)	413	(9.5)
Health insurance						
Private	7,618	(67.2)	5,081	(64.7)	2,537	(73.1)†
Public	1,724	(12.5)	1,120	(11.7)	604	(14.3)
None	2,587	(20.3)	2,083	(23.6)	504	(12.7)
Regular physician						
Yes	9,607	(81.4)	6,349	(77.5)	3,258	(90.5)†
No	2,275	(18.6)	1,915	(22.5)	360	(9.5)
Physician contacts within past year						
None	2,492	(20.9)	2,006	(24.2)	486	(13.0)†
1	2,056	(17.5)	1,522	(18.7)	534	(14.5)
2–3	3,103	(27.0)	2,132	(26.1)	971	(29.0)
4–9	2,582	(21.9)	1,591	(19.4)	991	(27.6)
≥10	1,578	(12.8)	964	(11.5)	614	(15.8)
Hospitalized within past year						
Yes	1,026	(7.9)	656	(7.4)	370	(9.3)†
No	10,933	(92.1)	7,654	(92.6)	3,279	(90.7)
High-risk conditions¶						
Yes	2,444	(20.2)	1,227	(14.8)	1217	(32.8)†
No	9,502	(79.8)	7,075	(85.2)	2,427	(67.2)
Asthma						
Yes	525	(4.2)	345	(4.2)	180	(4.2)
No	11,433	(95.8)	7,964	(95.8)	3,469	(95.8)
Diabetes						
Yes	822	(7.1)	298	(3.8)	524	(14.7)†
No	11,133	(92.9)	8,008	(96.2)	3,125	(85.3)
Heart disease						
Yes	996	(8.1)	418	(5.0)	578	(15.5)†
No	10,960	(91.9)	7,892	(95.0)	3,068	(84.5)
Health-care personnel						
Yes	1,134	(8.8)	813	(9.2)	321	(7.8)†
No	10,826	(91.2)	7,497	(90.8)	3,329	(92.2)

* Respondents who answered "don't know" or refused to answer were excluded from the analysis.
† Significant difference between adults aged 18–49 years and adults aged 50–64 years ($p<0.05$, by chi-square test).
§ Poverty status was defined using 2009 poverty thresholds published by the U.S. Census Bureau; below poverty was defined as a total family income of <$21,756 for a family of four (available at http://www.census.gov/hhes/www/poverty/data/threshld/thresh09.html).
¶ Respondents were asked whether they had ever been told by a physician or other health professional that they have diabetes, emphysema, cancer or a malignancy of any kind (excluding nonmelanoma skin cancer), lymphoma, leukemia, or blood cancer or had coronary heart disease, angina, a heart attack, or another heart condition. Respondents also were asked whether, in the past 12 months, they had experienced an asthma episode or attack or had been told by a physician they have chronic bronchitis or weak or failing kidneys.

TABLE 2. Percentage of adults aged 18–64 years who received an influenza vaccination, by demographic characteristics, health insurance status, selected health conditions, and age group* — National Health Interview Survey, United States, 2008–09 influenza season

	Age group (yrs)					
	18–64		18–49		50–64	
Characteristic	%	(95% CI)	%	(95% CI)	%	(95% CI)
Total	**28.2**	**(26.9–29.4)**	**22.4**	**(21.1–23.8)**	**41.9†**	**(39.5–44.3)†**
Sex						
Male§	24.2	(22.5–25.9)	18.0	(16.2–19.8)	39.3†	(35.6–43.0)†
Female	32.0¶	(30.2–33.7)¶	26.7¶	(24.7–28.7)¶	44.2†,¶	(40.9–47.4)†,¶
Race/Ethnicity						
White, non-Hispanic§	30.2	(28.6–31.7)	23.7	(21.9–25.6)	43.3†	(40.5–46.1)†
Black, non-Hispanic	26.1¶	(23.3–29.0)¶	21.1	(18.2–23.9)	40.3†	(33.8–46.9)†
Hispanic	20.8¶	(18.0–23.5)¶	17.4¶	(14.9–20.0)¶	35.0†,¶	(27.2–42.7)†,¶
Other	28.7	(24.2–33.2)	25.5	(20.6–30.4)	39.2†	(27.8–50.5)†
Marital status						
Married§	31.9	(30.1–33.7)	26.0	(23.9–28.1)	42.6†	(39.4–45.7)†
Widowed, divorced, or separated	29.8	(27.2–32.5)	19.7¶	(16.5–23.0)¶	40.0†	(36.0–44.1)†
Never married	21.2¶	(19.2–23.3)¶	18.6¶	(16.5–20.8)¶	41.5†	(35.5–47.4)†
Education						
<High school§	21.7	(18.8–24.5)	16.7	(13.3–20.0)	35.3†	(29.0–41.7)†
High school graduate	24.1	(21.7–26.4)	16.8	(14.1–19.5)	38.1†	(33.9–42.4)†
Some college, college graduate, or higher	31.3¶	(29.7–32.8)¶	25.8¶	(24.1–27.5)¶	45.2†,¶	(42.0–48.5)†,¶
Employment status						
Employed§	28.0	(26.6–29.5)	23.3¶	(21.7–24.9)¶	40.7†	(37.6–43.7)†
Not employed	28.5	(26.2–30.8)	19.8	(17.2–22.5)	44.1†	(40.5–47.6)†
Poverty level						
At or above poverty	29.4¶	(28.0–30.9)¶	23.6¶	(21.9–25.2)¶	42.8†,¶	(40.0–45.6)†,¶
Below poverty§ **	20.2	(17.6–22.8)	16.7	(13.9–19.5)	34.9†	(28.5–41.3)†
Health insurance						
Private§	32.7	(31.1–34.2)	27.0	(25.1–28.8)	44.4†	(41.6–47.2)†
Public	32.0	(28.4–35.5)	22.7¶	(19.1–26.2)¶	50.9†	(44.6–57.2)†
None	12.1¶	(9.9–14.2)¶	10.5¶	(8.2–12.8)¶	18.9†,¶	(14.2–23.7)†,¶
Regular physician						
Yes§	31.9	(30.5–33.3)	25.5	(23.9–27.1)	44.8†	(42.2–47.5)†
No	12.6¶	(10.3–14.9)¶	12.1¶	(9.5–14.7)¶	14.8¶	(9.8–19.8)¶
Physician contacts within past year						
None§	11.6	(9.6–13.6)	11.0	1(8.9–13.2)	14.4	(9.8–18.9)
1	22.4¶	(19.7–25.1)¶	20.3¶	(17.3–23.2)¶	29.0†,¶	(23.5–34.5)†,¶
2–3	30.6¶	(28.0–33.1)¶	24.9¶	(21.9–27.9)¶	42.6†,¶	(38.0–47.1)†,¶
4–9	37.3¶	(34.5–40.2)¶	28.5¶	(25.2–31.9)¶	52.3†,¶	(47.8–56.9)†,¶
≥10	43.3¶	(39.4–47.2)¶	34.8¶	(30.3–39.3)¶	57.7†,¶	(51.6–63.8)†,¶
Hospitalization within past year						
Yes§	41.6	(37.1–46.0)	32.0	(26.5–37.4)	59.6†	(51.8–67.5)†
No	27.0¶	(25.7–28.2)¶	21.7¶	(20.3–23.1)¶	39.9†,¶	(37.4–42.4)†,¶
High-risk conditions††						
Yes§	41.4	(38.6–44.3)	31.9	(27.8–36.0)	51.2†	(47.2–55.1)†
No	24.8¶	(23.5–26.1)¶	20.8¶	(19.3–22.2)¶	37.2†,¶	(34.3–40.1)†,¶
Asthma						
Yes§	38.7	(32.6–44.8)	32.3	(24.5–40.1)	52.3†	(42.3–62.2)†
No	27.7¶	(26.5–29.0)¶	22.0¶	(20.6–23.4)¶	41.4†,¶	(39.0–43.9)†,¶
Diabetes						
Yes§	49.0	(42.9–55.2)	44.2	(34.6–53.9)	52.2†	(44.8–59.6)†
No	26.6¶	(25.3–27.9)¶	21.6¶	(20.2–23.0)¶	40.2†,¶	(37.6–42.7)†,¶
Heart disease						
Yes§	42.5	(37.8–47.2)	32.1	(25.0–39.2)	50.3†	(44.0–56.6)†
No	26.9¶	(25.6–28.1)¶	21.9¶	(20.5–23.3)¶	40.3†,¶	(37.7–42.9)†,¶
Health-care personnel						
Yes§	53.0	(48.8–57.1)	51.5	(46.1–56.9)	56.8	(49.4–64.3)
No	25.8¶	(24.6–27.1)¶	19.5¶	(18.2–20.9)¶	40.6†,¶	(38.0–43.2)†,¶

Abbreviation: CI = confidence interval.

* Respondents who answered "don't know" or refused to answer were excluded from the analysis.

† p<0.05 by t-test for comparisons of vaccination coverage between persons aged 18–49 years and persons aged 50–64 years.

§ Referent group.

¶ p<0.05 by t-test for comparisons within each variable with the indicated reference level.

** Poverty status was defined using 2009 poverty thresholds published by the U.S. Census Bureau; below poverty was defined as a total family income of <$21,756 for a family of four (available at http://www.census.gov/hhes/www/poverty/data/threshld/thresh09.html).

†† Respondents were asked whether they had ever been told by a physician or other health professional that they have diabetes, emphysema, cancer or a malignancy of any kind (excluding nonmelanoma skin cancer), lymphoma, leukemia, or blood cancer or had coronary heart disease, angina, a heart attack, or another heart condition. Respondents also were asked whether, in the past 12 months, they had experienced an asthma episode or attack or had been told by a physician they have chronic bronchitis or weak or failing kidneys.

than adults who did not have insurance (Table 2). However, influenza vaccination coverage was higher among adults aged 18–49 years who had private insurance than among those aged 18–49 years who had public insurance. Those who had some type of health insurance were more likely to have a regular physician and to have had two or more provider contacts within the past year than those who did not have insurance (Table 3). Coverage was twofold to threefold higher among those who had a regular physician compared with those who did not (Tables 2 and 3). In addition, influenza vaccination coverage was higher among persons who had any physician contacts within the past year compared with those who had none, with coverage increasing with increasing number of physician contacts (Tables 2 and 3). However, most respondents (56.7%–77.6%) with one or more provider contacts were not vaccinated (Table 2).

Discussion

The most effective strategy for preventing influenza is annual influenza vaccination (*4*). The *Healthy People 2020* immunization and infectious diseases objective 12 (objective IID-12) is to increase the percentage of children and adults who are vaccinated annually against seasonal influenza (*9*). The *Healthy People 2020* objectives for influenza vaccination range from 80% to 90% for population groups including noninstitutionalized healthy adults aged 18–64 years and adults with high-risk conditions aged 18–64 years, health-care personnel, and pregnant women. The findings reported here indicate that influenza vaccination coverage is well below the *Healthy People 2020* objectives (*9*). Substantial improvement in influenza vaccination coverage is needed to achieve *Healthy People 2020* targets.

Although the influenza vaccination level of 41.4% for noninstitutionalized adults aged 18–64 years with high-risk conditions was higher than that for adults without high-risk conditions (24.8%), the percentage is well below the *Healthy People 2020* target of 90%. Vaccination of healthy adults aged <65 years can decrease work absenteeism and use of health-care resources, including use of antibiotics, when the vaccine and circulating viruses are well matched (*10–12*). Vaccine effectiveness among adults aged <65 years with high-risk conditions is typically lower than that reported for healthy adults; however, substantial data exist regarding the benefits of influenza vaccination in persons with high-risk

TABLE 3. Percentage of adults aged 18–64 years with and without health insurance, by usual health-care provider, physician contacts, and receipt of influenza vaccination* — National Health Interview Survey, United States, 2008–09 influenza season

Characteristic	Total			Received influenza vaccination†	
	No.	%	(95% CI)	%	(95% CI)
With health insurance§					
Regular physician					
Yes§	8,334	89.9	(89.0–90.8)	34.1	(32.6–35.6)
No	944	10.1¶	(9.2–11.0)¶	18.7¶	(14.7–22.6)¶
Physician contacts within past year					
None§	1,308	14.4	(13.5–15.4)	16.3	(13.3–19.3)
1	1,569	17.2¶	(16.2–18.3)¶	24.8¶	(21.6–27.9)¶
2–3	2,678	29.6¶	(28.4–30.8)¶	32.8¶	(30.1–35.5)¶
4–9	2,276	24.5¶	(23.4–25.6)¶	40.0¶	(37.0–43.0)¶
>10	1,392	14.3	(13.5–15.2)	45.7¶	(41.6–49.9)¶
Without health insurance					
Regular physician					
Yes§	1,252	48.6**	(46.0–51.2)**	16.2**	(13.1–19.3)**
No	1,318	51.4**	(48.8–54.0)**	8.4¶,**	(5.5–11.3)¶,**
Physician contacts within past year					
None§	1,175	46.0**	(43.4–48.7)**	6.3**	(3.8–8.7)**
1	480	18.3¶	(16.4–20.3)¶	13.6¶,**	(8.9–18.2)¶,**
2–3	418	16.9¶,**	(15.0–19.1)¶,**	16.6¶,**	(9.3–23.9)¶,**
4–9	299	11.8¶,**	(10.3–13.5)¶,**	17.8¶,**	(12.0–23.5)¶,**
≥10	185	6.9¶,**	(5.8–8.1)¶,**	25.5¶,**	(15.9–35.0)¶,**

Abbreviation: CI = confidence interval.

* Respondents who answered "don't know" or refused to answer were excluded from the analysis.

† Estimates based on the responses of participants in the respective categories who answered "yes" to the question, "During the past 12 months, have you had a flu shot?" The sample sizes for the influenza vaccination estimates are not shown and might be different from the sample sizes for respondents with or without insurance, regular physicians, or physician visits shown in this table because persons who refused or did not know their vaccination status were excluded from the analysis.

§ Referent group.

¶ p<0.05 by t-test for comparisons within each set of covariates with the referent group.

** p<0.05 by t-test for comparison with the same variable within the category of respondents with health insurance.

conditions (*4,13*). The higher influenza vaccination coverage among persons with diabetes might reflect interventions to improve vaccination in this population, including support by professional organizations incorporating influenza vaccination recommendations into clinical care guidelines (*4,13,14*).

The findings in this report are consistent with previous reports indicating that persons who have insurance coverage, a usual place for health care or medical home, and who seek medical care one or more times during the year are more likely to be vaccinated against influenza and receive other preventive services, compared with those who are uninsured and do not have a usual place for health care (*15–19*). As indicated in this report and NHIS data for the 2005–06 influenza season (*15*), the likelihood of receiving an influenza vaccination increased with increasing numbers of health-care visits. However, many opportunities for vaccination likely are being missed; even among persons with health insurance and >10 physician contacts within the past year, approximately 57% were not vaccinated. Persons without insurance were less likely to receive influenza vaccination than their counterparts who had either private or public insurance. Uninsured persons who obtain insurance might not be able to rapidly catch up with their already-insured peers in regard to use of preventive services. Although insurance provides access to care, a relatively long period might elapse before appropriate prevention services are received (*18*). However, receipt of preventive services, including influenza vaccination, can increase substantially among adults who have insurance and a usual place for health care (*19*).

The lower seasonal influenza vaccination coverage for Hispanics and blacks compared with whites has been observed in previous influenza seasons among adults (*20–22*). Numerous factors play a role in these racial/ethnic disparities, including differences in attitudes toward vaccination and preventive care, propensity to seek and accept vaccination, variations in likelihood that providers recommend vaccination, and differences in quality of care received by racial/ethnic populations (*4,23–32*). Broad use of interventions to remove barriers to access to care and to make vaccination services in health-care and other settings a routine practice are important components of efforts to reduce these disparities (*33,34*).

Pregnant women have an increased risk for complications from influenza (*35–42*) and are a priority group for vaccination (*4*). Estimates for women who might have been pregnant during the 2008–09 influenza season are not included in this report because the estimates might be misleading. Pregnant women identified by NHIS were those who were pregnant at the time of the survey, and information on the stage of pregnancy or estimated date of delivery was not available. Some women who were pregnant during the vaccination period might have been missed, and some who were not pregnant during the vaccination period might have been included. A more accurate estimate of the influenza vaccination status among pregnant women can be derived by ascertaining pregnancy status during the influenza vaccination period. Starting with the 2012 NHIS, this survey will collect information on influenza vaccination before, during, or after a recent or current pregnancy to ascertain whether a woman was pregnant during the influenza vaccination period. Other data sources that more specifically ascertain which women were pregnant during the influenza vaccination period are available (*43–45*).

ACIP recommends that all health-care personnel be vaccinated for influenza and certain other vaccine-preventable diseases to safeguard the health of personnel and protect patients from influenza virus infection through exposure to workers with influenza (*4,46*). Persons who should be vaccinated include all persons working in health-care settings, who have the potential for exposure to patients or residents or to infectious materials, including body substances, contaminated medical supplies and equipment, environmental surfaces, or contaminated air. Despite annual influenza vaccination being recommended by ACIP and being one of the standards for adult immunization practice (*47*), influenza vaccination coverage among health-care personnel is not optimal. The rate found in this report (53.0%) is well below the 90% *Healthy People 2020* target. With moderate effort, organized campaigns can attain higher vaccination levels among health-care personnel, and mandatory influenza vaccination policies for health-care personnel have been demonstrated to be a highly effective approach to achieving high vaccination coverage in this population (*4*).

The findings in this report are subject to at least two limitations. First, the determination of vaccination status and identification of high-risk conditions in NHIS were not validated by medical records; self-report of vaccination can introduce recall bias and might result in an overestimation of rates. However, adult self-reported influenza vaccination status has been shown to be sensitive and specific (*48–50*). Second, information was not available for certain high-risk conditions (such as chronic neurologic conditions) identified by ACIP.

Conclusion

Substantial improvement in annual influenza vaccination of recommended groups is needed to reduce the health impact of influenza. Successful influenza vaccination programs combine education of potential vaccine recipients and publicity, increased access to influenza vaccination in medical and complementary settings such as workplaces and commercial establishments (e.g., pharmacies and chain stores), and use of

practices shown to improve vaccination coverage, including reminder and recall systems, efforts to remove administrative and financial barriers to vaccination, use of standing orders programs for influenza vaccination, and assessment of practice-level vaccination rates with feedback to staff (*4*). The Affordable Care Act requires that certain clinical preventive services be provided without cost sharing in Medicare and by newly qualified health plans. The Affordable Care Act also encourages state Medicaid programs to offer selected clinical preventive services with no cost sharing (*7*). Beginning in 2013, state Medicaid programs that eliminate cost sharing for these preventive services may receive enhanced federal matching funds for them (*7,51*). The expanded enrollment in public and private insurance programs expected from provisions of the Affordable Care Act might improve access to health-care services, including vaccination, for persons who were previously uninsured. Although health insurance coverage can improve access to health-care services, insurance alone might not be sufficient to achieve optimal influenza vaccination levels (or coverage). The findings in this report indicate that even among those with health insurance and >10 contacts with physicians within the past year, influenza vaccination coverage did not meet the *Healthy People* 2020 target. Other provisions of the Affordable Care Act that create incentives for primary care, including increased payments for primary care services provided by primary care doctors and coverage without cost sharing (*34*) for vaccines recommended by ACIP, also should help to improve influenza vaccination coverage.

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Conclusions and Future Directions for Periodic Reporting on the Use of Selected Adult Clinical Preventive Services — United States

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The findings described in this supplement can help improve collaboration among public health and other stakeholders who influence population health, including employers, health plans, health professionals, and voluntary associations, to increase the use of a set of clinical preventive services that, with improved use, can substantially reduce morbidity and mortality in the U.S. adult population (*1–19*). This supplement highlighted that the use of the clinical preventive services in the U.S. adult population is not optimal and is quite variable, ranging from approximately 10% to 85%, depending on the particular service (Table). Use was particularly low for tobacco cessation, aspirin use to reduce risk of cardiovascular disease, and influenza vaccination; however, ample opportunity exists to improve use of all of these services. Among the specific populations least likely to have used the recommended services (*2–10*), persons with no insurance, no usual source of care, or no recent use of the health-care system (if included in the analysis) were the groups least likely to have used the services. Use among the uninsured was generally 10 to 30 percentage points below the general population averages, suggesting that improvements in insurance coverage are likely to increase use of these clinical preventive services. A randomized, controlled trial of an expansion of Medicaid coverage by Oregon in 2008 supports this hypothesis by demonstrating improved use of clinical services with increased health insurance coverage (*20*). A recent survey among the uninsured found a low level of awareness of the provisions of the Patient Protection and Affordable Care Act of 2010 as amended by the Healthcare and Education Reconciliation Act of 2010 (referred to collectively as the Affordable Care Act [ACA]) (*21*). Therefore, improving opportunities for coverage might be insufficient, and focused efforts by governmental health agencies and other stakeholders are likely to be needed to enroll uninsured persons in health plans. In addition, although use of the preventive services in insured populations was greater than among the uninsured, use among the insured was generally <75%, and often much less (*2–10*). Therefore, having health insurance coverage might not itself be sufficient to optimize use of clinical preventive services, and additional measures to improve use are likely to be necessary.

Opportunities Identified by Key Findings

The suboptimal use of adult clinical preventive services reported in this supplement can be improved and morbidity and mortality substantially reduced. Public health, other stakeholders, and communities can make use of the strategies identified in the reports to improve service use, including increasing health insurance coverage through effective implementation of the Affordable Care Act, participating in quality of care improvement initiatives, increasing the integrated use of electronic health information systems, implementing the National Prevention Strategy, better coordinating and integrating public health and clinical care, and increasing use of evidence-based community interventions to improve service use. For use of these services to actually increase and for the related improvements in the health of the U.S. adult population to be realized, key stakeholders and communities will need to take advantage of the opportunities and act to implement these strategies. Public health surveillance reports, such as this supplement, can play a key role in promoting accountability among stakeholders by monitoring and reporting on progress both in the use of clinical preventive services and in the implementation of strategies to improve service use.

The reports in this supplement identified numerous evidence-based, effective community interventions and quality-of-care improvement initiatives that can be implemented by stakeholders to increase use of clinical preventive services

TABLE. Percentage of adults who are receiving selected clinical preventive services — United States

Topic/Indicator (years received)	% receiving service
Aspirin and other antiplatelet therapy (2005–2008)	
Adults aged ≥18 years with a history of ischemic vascular disease who are prescribed aspirin or antiplatelet therapy to prevent recurrent CVD	46.9*
Men aged 45–79 years and women aged 55–79 years without ischemic vascular disease who are prescribed aspirin when the potential benefit of a reduction in myocardial infarction or stroke, respectively, outweighs the potential harm attributable to an increase in gastrointestinal hemorrhage	17.1*
Hypertension management (2005–2008)	
Adults aged ≥18 years with hypertension whose blood pressure is under control	43.6†
Lipid management (2005–2008)	
Men aged ≥20 years for whom lipid screening is recommended who have been screened for lipid disorders in the past 5 years	66.6§
Women aged ≥20 years for whom lipid screening is recommended who have been screened for lipid disorders in the past 5 years	74.4§
Men and women aged >20 years for whom lipid screening is recommended who have been screened for lipid disorders in the past 5 years	70.1§
Diabetes management (2007–2010)	
Adults aged ≥18 years with diagnosed diabetes whose glycohemoglobin (A1c) is ≤9%	87.1¶
Tobacco cessation (2005–2008)	
Office-based ambulatory care setting visits with screening for tobacco use among adults aged ≥18 years	62.7**
Office-based ambulatory care setting visits with tobacco cessation counseling among current tobacco users in adults aged ≥18 years	20.9**
Office-based ambulatory care setting visits with tobacco cessation medication prescribed among current tobacco users in adults aged ≥18 years	7.6**
Breast cancer screening (2010)	
Women aged ≥40 years who had a mammogram within the previous 2 years	75.4††
Women aged 50-74 years who had a mammogram within the previous 2 years	79.7††
Colorectal cancer screening (2010)	
Adults aged 50–75 years who have had an FOBT within the past year, sigmoidoscopy within the past 5 years and FOBT within the past 3 years, or colonoscopy within the past 10 years	64.5§§
HIV screening (2005–2008)	
Persons aged ≥13 years living with HIV who know they are infected	79.9¶¶
Influenza vaccination (2009)	
Adults aged 18–64 years who have received the seasonal influenza vaccine	28.0***

Abbreviations: CVD = cardiovascular disease; FOBT = fecal occult blood test; HIV = human immunodeficiency virus.

* **Source:** CDC. Recommended use of aspirin and other antiplatelet medications among adults—National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey, United States, 2005–2008. In: Use of selected clinical preventive services among adults—United States, 2012. MMWR 2012;61(Suppl; June 15, 2012):11–8.

† **Source:** CDC. Control of hypertension among adults—National Health and Nutrition Examination Survey, United States, 2005–2008. In: Use of selected clinical preventive services among adults—United States, 2012. MMWR 2012;61(Suppl; June 15, 2012):19–25.

§ **Source:** CDC. Screening for lipid disorders among adults—National Health and Nutrition Examination Survey, United States, 2005–2008. In: Use of selected clinical preventive services among adults—United States, 2012. MMWR 2012;61(Suppl; June 15, 2012):26–31.

¶ **Source:** CDC. Characteristics associated with poor glycemic control among adults with self-reported diagnosed diabetes—National Health and Nutrition Examination Surveys, United States, 2007–2010. In: Use of selected clinical preventive services among adults—United States, 2012. MMWR 2012;61(Suppl; June 15, 2012):32–7.

** **Source:** CDC. Tobacco use screening and counseling during physician office visits among adults—National Ambulatory Medical Care Survey and National Health Interview Survey, United States, 2005–2009. In: Use of selected clinical preventive services among adults—United States, 2012. MMWR 2012;61(Suppl; June 15, 2012):38–45.

†† **Source:** CDC. Breast cancer screening among adult women—Behavioral Risk Factor Surveillance System, United States, 2010. In: Use of selected clinical preventive services among adults—United States, 2012. MMWR 2012;61(Suppl; June 15, 2012):46–50.

§§ **Source:** CDC. Prevalence of colorectal cancer screening among adults—Behavioral Risk Factor Surveillance System, United States, 2010. In: Use of selected clinical preventive services among adults—United States, 2012. MMWR 2012;61(Suppl; June 15, 2012):51–6.

¶¶ **Source:** CDC. Prevalence of undiagnosed HIV infection among persons aged ≥13 years—National HIV Surveillance System, United States, 2005–2008. In: Use of selected clinical preventive services among adults—United States, 2012. MMWR 2012;61(Suppl; June 15, 2012):57–63.

*** **Source:** CDC. Influenza vaccination coverage among adults—National Health Interview Survey, United States, 2008–09 influenza season. In: Use of selected clinical preventive services among adults—United States, 2012. MMWR 2012;61(Suppl; June 15, 2012):64–71.

(*2–10,19*). Many of the community interventions have been found to improve service use among underserved populations (*2–10,19*). The specific interventions available vary somewhat depending on the service but commonly include reducing barriers to access to the service and integrating into health-care systems the ability to easily track service use and prompt clinicians or patients when the service is needed.

Most of the reports identified aspects of recent health-care reform initiatives that should facilitate increased use of these services (*2–10*). For example, when fully implemented, the Affordable Care Act is projected to extend health insurance coverage to approximately 93% of U.S. residents by 2016 (*11,22*). In 2009, 19.5% of the population (58.7 million persons) lacked health insurance for at least some part of the previous 12 months (*23*). In addition, the Affordable Care Act requires that certain clinical preventive services be provided without cost sharing by Medicare and newly qualified private health insurance plans and encourages the provision

of selected services at no cost by Medicaid (*11*). A February 2012 analysis by the U.S. Department of Health and Human Services (HHS) reported that 54 million persons are receiving preventive services coverage without cost sharing as a result of the Affordable Care Act; 14.1 million of these are children aged ≤17 years, 20.4 million are women aged 18–64 years, and 19.5 million are men aged 18–64 years (*24,25*). In addition, HHS reported that 35 million Medicare beneficiaries are receiving free preventive services (*24,25*).

Health System Reforms at State and Local Levels

The Affordable Care Act includes provisions to improve disease prevention and health promotion, improve the quality of health care, and lower health-care costs (*11,22*). Implementation of those health system and public health provisions is largely the responsibility of states and communities, health insurers, and health-care providers, and choices made during implementation will directly affect use of clinical preventive services by those populations. Starting in 2014, Medicaid will expand to cover persons with incomes ≤133% of the federal poverty level (*22*). By 2016, an additional 16 million persons will be covered through Medicaid and the Children's Health Insurance Program (CHIP) (*22*). In addition, starting in 2014, the law creates state-based health insurance exchanges to make private health insurance available to small employers and to individual persons and families not eligible for Medicaid or CHIP (*26,27*). Within broad parameters, the law affords states considerable discretion in how they structure features of the plans, which can affect the delivery of clinical preventive services: cost sharing, eligibility for additional low-income subsidies, whether the exchange will include all qualified plans or only those with which the state contracts, governance, rating rules, adjusting premiums for risk, the range of benefit options, how to facilitate comparison shopping among plans, and public protections (*27*). Each of these decisions can directly or indirectly affect use of clinical preventive services and receipt of needed treatment.

Opportunities for states and communities to increase the use of clinical preventive services also are provided by national legislation supporting increased use of health information technology and electronic health records in hospitals and clinics (*1,28*). Electronic health information systems have the potential to improve the identification of individual persons and populations in need of services (e.g., persons who have not had a cholesterol check within the recommended interval or who have not received their annual influenza vaccine), provide reminders to both the health-care providers and patients about the need, and monitor and report on use of the services (*1*). State and local governments can play important roles in the implementation of such systems by providing leadership and governance, participating in the exchange of health information, and monitoring and reporting on adoption of health information systems to the public (*28*).

Public Health and Clinical Care

Interaction between clinical and community preventive services is recognized as one of four core strategies in the first National Prevention Strategy (*11,29*). The Affordable Care Act called for the development of the National Prevention Strategy in recognition of the essential role of prevention in improving the health of persons in the United States (*11,29*). Making meaningful health improvements through prevention will require action both within and beyond the health-care sector. The National Prevention Strategy highlights the important role of preventive services, including both clinical preventive services and community services discussed in this supplement, and the responsibility of communities to support these services. The public health sector can play a critical role in informing the public and key stakeholders about the benefits of clinical preventive services and in promoting evidence-based strategies such as those identified in this supplement. The National Prevention Strategy recognizes that patients receive both clinical and community services when they receive appropriate clinical preventive care that is supported by community-based resources such as tobacco quitlines, physical activity programs, and community programs to address barriers to health-care access. The combination of clinical and community services can optimize health through preventive health services. In addition, public health data on the use of preventive services, such as those highlighted in these reports, are critical for planning and monitoring community and health system interventions to increase the use of these services.

In this context, state, tribal, local, and territorial public health agencies have new opportunities to improve use of the clinical preventive services discussed in this supplement by improving the coordination and integration of agency services with those sponsored by state Medicaid agencies and those delivered by the health-care system. In the United States, the medical and public health fields have historically been in separate, although occasionally overlapping, realms. Realizing the potential for the Affordable Care Act to address U.S. health challenges of the 21st century, such as the aging population, increasing rates of chronic illness, and fragmented delivery of health care, will require the coordinated and deliberate redesign of the health care and public health systems.

Several steps might be considered by public health and other stakeholders to improve delivery of the clinical services identified in this supplement by better coordinating efforts and improving coordination of clinical care and public health. Health officials can share this report with their clinical community and convene meetings to discuss statewide and local strategies to support the optimal use of preventive services. They can work with employers and insurers to review health plan benefit language to improve coverage for all of the medical procedures required to implement a single clinical practice guideline and for appropriate populations to be covered (*30,31*). Health officials also can facilitate collaboration among hospital associations, medical staff leaders, professional trade associations, and residency program directors to improve access to preventive services. Medical practices that use electronic health records can assess individual practitioner or group practice performance on service delivery and work to improve office systems that increase rates of use. At the same time, public health officials can apply strategies to encourage members of the public to seek these services and help practitioners to understand the community services available to their patients to support health-promoting behaviors such as tobacco cessation. Claims data for state Medicaid and private insurance can be used locally to target attention to populations with the greatest service gaps. Public health professionals can work with leaders in business, voluntary associations, and faith-based organizations to use their leadership positions to increase awareness of the gap in services and encourage the use of clinical preventive services.

Improving Public Health Surveillance

Ideally, public health surveillance systems would have the capacity to track, in a timely, comprehensive, and accurate manner, the effects of numerous efforts that might influence use of clinical preventive services, including implementation of the Affordable Care Act and electronic health information systems, as well as actions by public health and other stakeholders. These systems would have the ability to characterize persons who are eligible for specific services and those who do or do not receive them, examine the effects of legislation and other interventions, and assess resulting health outcomes at both the individual and population levels. The ability of current resources and public health surveillance systems to examine such relationships is limited. However, surveillance reports such as those in this supplement can be helpful by highlighting underuse of the services, identifying trends that might be due, in part, to various interventions currently underway, and illuminating disparities. The reports in this supplement also highlight several gaps in the types of health surveillance information needed to guide efforts to increase use of important clinical preventive services. For example, as noted in the Rationale for this supplement, several preventive services of interest could not be addressed because of a lack of available information (*1*). Although all these reports present national data, most cannot provide data that are necessary to monitor progress at the state and local levels. This supplement challenges health and public health professionals to identify resources that can be used to provide information at the state and local levels.

Additional sources of health surveillance information might help address some of the gaps identified in these reports. Increasing use of electronic health information systems and electronic data exchange systems offers the possibility of collecting and reporting on use of clinical preventive services at the national, state, and local levels (*1,28*). State and local surveys, such as the Behavioral Risk Factor Surveillance System, might be able to capture more of the kind of information included in this supplement. Deidentified information from Medicare and Medicaid databases also might provide new opportunities for this type of surveillance (*32*). Additional sources of information for surveillance and an increased ability to link information from a various sources can help provide a more complete and integrated perspective on steps that stakeholders need to take to improve use of these services.

Future Reports on Clinical Preventive Services

Surveillance reports on the use of selected clinical preventive services by U.S. adults will be published periodically. Future reports might include additional indicators for clinical preventive services that are known to have important health benefits but were not included in this supplement for various reasons, primarily lack of adequate surveillance information (*1*). Such reports might include screening and counseling for alcohol consumption and for mental health, services that can benefit large segments of the adult population. Because this supplement does not address the important goal of improving use of clinical preventive services for adolescents and children, CDC is planning a surveillance report on use of those services and methods for improvement. As information becomes more available in public health surveillance systems, future reports might be useful for monitoring interventions implemented by public health and other stakeholders to improve service use.

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